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ORIGINAL COMMUNICATIONS

THE DYNAMICS OF THE FEMALE PELVIS; ITS EVOLUTION AND ARCHITECTURE WITH RESPECT TO FUNCTION.*

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(With six illustrations.)

A CONSIDERATION of the facts pertaining to the process of parturition in the human female leads one to the conclusion that herein must lie one of the disharmonies of function and structure so elaborated by Metchnikoff.

The entire group of reproductive phenomena should naturally occur as a purely physiological cycle, with no pathological element entering at any time, in the case of the normal healthy female.

This physiological cycle is, however, broken at two points in the usual normal pregnancy (1) by the occurrence of the toxemia of early pregnancy, the nausea and emesis of the first few months, and (2) by the trauma, and exhaustion of labor, due mainly to the difficult passage of the fetus through a bony canal not entirely adapted for its reception and egress.

Inasmuch as natural laws, in so far as known, are always logical, there must be some definite cause underlying the difficulties attending the birth of a child, and in the opinion of the writer the existing disharmony may well be explained by a study of the evolution of the pelvis. In the evolution of any structure or group of structures one is impressed by the constancy of a law which is, broadly expressed, that morphology always follows function, or the anatomy of a part alters to suit a changed physiology with such modifications as

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are necessary to fit each part properly to interact with the other structures comprising the entire animal.

If this law be applied to the subject under discussion it will be apparent that in the development of the present type human being two great functions of the lower animal form have been widely changed, the assumption of the upright position on the part of man, and the enormous increase of intellectual power, necessitating a change in the form of the head to contain the expanded brain.

According to the terms of the expressed law, such change in function would, of necessity, be followed by an altered morphology. In the pelvis there must have taken place such changes as would permit the trunk to be carried erect and such modification of the contour of the cavity as would allow the passage of the enlarged cranium of the child.

The second clause of the law becoming operative will explain this seemingly imperfect evolution to suit the changed conditions as due to some related necessity for the fulfilment of an independent function of the pelvic girdle. All the uses of this bony group must therefore be examined.

The main functions of the pelvis are five in number: (1) to attach the legs or hinder limbs to the trunk; (2) to furnish points of attachment and fulcra for the great muscles which move the limbs, and, in the case of man, hold the trunk erect; (3) to provide egress and support for the terminal canals of the intestinal and urinary systems; (4) to provide for a birth passage; (5) to act as a shelf and support for the abdominal viscera.

All of these functions are perfectly served by the architecture of the pelvis in quadrupeds and accordingly, in these forms, the disharmonies of reproduction do not occur, in so far as they refer to parturition. As the evolution of man proceeded, however, the structure of the pelvis with respect to its functions became modified, necessity developing one phase of its form at the expense of others until the resulting construction may be said, in man, to be a mechanical unit so altered by change in its use as to be more or less imperfect as concerns one important purpose of its existence, that is, the process of parturition.

The development of the human pelvis was influenced also by another fundamental law of evolution: that of natural selection.

It is apparent that the earliest females of the species were or were not able to give birth to young according as their pelves had widened sufficiently or not, and those who were unable to bear, either remained sterile or died in labor, with the result that all breeding was carried on by the females with wide pelves. Such a course of events naturally rapidly bred out the quadruped type of pelvis in the developing race.

If one were asked to construct a pelvis around an ideal bony canal for the passage of the human fetus, it would doubtless take the form of a funnel-shaped, bony basin, its cavity corresponding accurately to the contour of the flexed fetal head, and its segment of greatest contraction as short as consistent with rigidity sufficient to resist the pull of the great muscles.

There should be no obliquity of conformation, the bony canal being at the same height at all points.

Such a passage would oppose no obstacle to the descent of the fetus even at its bony segment, where, by reason of the mechanically perfect fit of the parts, the fetal head would pass unhindered, being opposed only by the elastic muscles and fascia.

In this ideal pelvis the length of the symphysis would be decreased as much as compatible with the factor of safety, the sacrum would be of exactly the same length, the promontory would be absent, and the pelvic cavity in its entirety would lie in a plane horizontal to the long axis of the mother and fetus, with possibly a slight slope downward anteriorly. It is noteworthy that the pelvis just described would, by reason of the absence of all inclination, prevent the process of internal rotation of the fetal presenting part, so important a phase of the mechanism of human parturition, but this very process of internal rotation is at best a compromise on the part of nature to compensate for the obliquity of the human pelvis, necessary for the maintenance of the upright position and in itself, is not an integral or even mechanically desirable method of accomplishing the object in view.

Internal rotation does not occur among quadrupeds and first appears, in so far as is known, among the anthropoid apes.

With regard to the single purpose of acting as a channel of egress for the fetus, the ideal birth canal as described would be perfect, but it must be remembered that all the functions of the pelvic girdle, some of them of constant, vital necessity, must be considered, and that it is the combination of uses, the modification of one detail to permit the introduction of another, which has resulted in the human type of pelvis as it now exists.

In order to well understand these various alterations and modifications as they occurred, it is essential to trace the evolution of the vertebrate pelvis in detail through the several animal groups in which such structure is found.

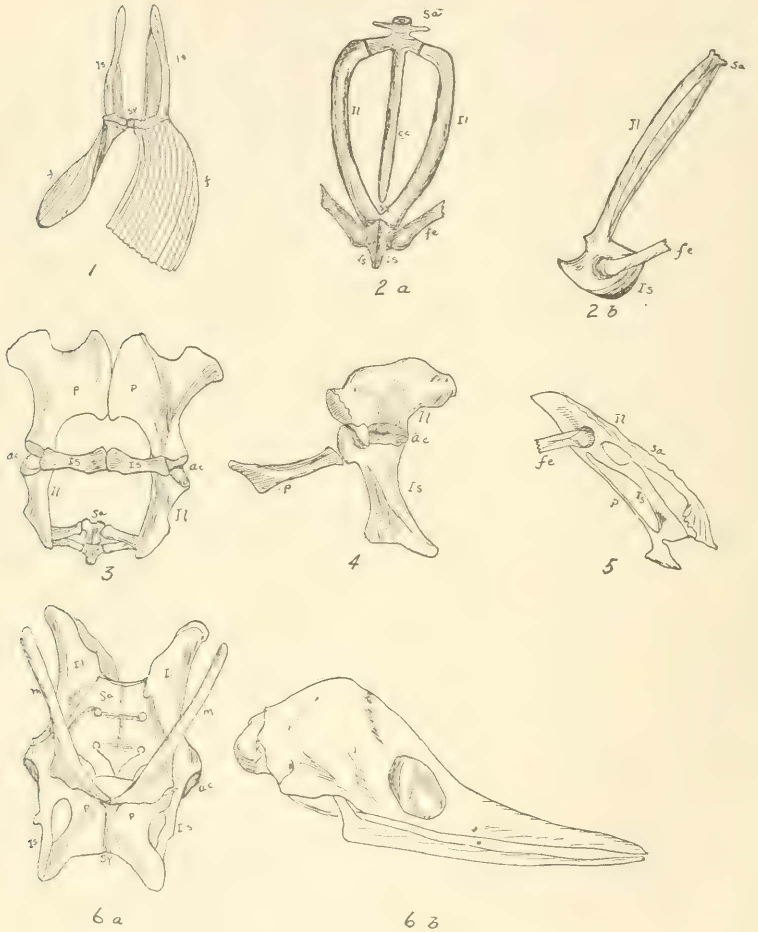


PLATE I.

FIG. 1.—Pelvis of the fish. The ischia unite in a symphysis and support the ventral fins.

FIG. 2.—Pelvis of the frog (Rana), *a*, anterior view, *b*, side view. The very long extension of the ilia take the shock of the leap.

FIG. 3.—Pelvis of the turtle. The sacrum and ilia are below, the large pubes above. The bone retains its threefold character.

FIG. 4.—Pelvis of the crocodile.

FIG. 5.—Fused pelvis of the bird.

FIG. 6.—Pelvis and skull of the echidna. *a*, pelvis, *b*, skull.

The pelvis makes its first appearance in the fishes, in which it consists of poorly developed, bony structures not fixed in position. Only the hemapophyseal portion of the pelvic arch is developed, and is always in connection with the ventral fins.

Fishes have isolated ischia, which are subtriangular, cartilaginous plates, supporting the fins by their expanded ends and either freely suspended in the muscular tissue or attached by their narrower ends to the coracoid process. In no fish is the incomplete pelvic arch directly attached to the vertebral column (Owen).

In most of the species the pelvis is represented by homologues of the ischia alone, but in a few Chimeroids there are found short, narrow processes, which extend above the place of articulation of the ventral fin and which simulate iliac bones (Fig. 1).

In reptiles the pelvis becomes more definite and the homologues of the integral structures may be distinguished.

In the frog (rana) and the toad (bufo) the impulse of the hind limbs is applied to the hindmost part of the body, beyond the greatly lengthened coccygeal style, by the remarkable backward prolongation of the ilia which expand and unite, forming a symphysis above the acetabula. Thence the impulse of the limbs is transmitted to the short and strong transverse processes of the sacrum. A pair of commonly anchylosed semicircular, bony plates, the ischia, unite with the iliac symphysis to form the lower half of the articulation for the femora (Fig. 2, *a*, *b*).

The Chelonia (turtles) offer an important phase of pelvic evolution, since in them the ossa innominata retain throughout life the threefold character seen in the human fetus, but the relative value of the separate bones is reversed. The sacrum is small and from its two centra short processes converge and afford a close ligamentous attachment to the proximal or upper ends of the ilia. These bones are also attached to the central plates of the carapace which they support as stout, strong pillars.

They slightly expand at their acetabular ends, when each unites with two other bones, the ischia and the pubes. A short, slender, straight ischium running transversely across the posterior aspect of the pelvis, and a broad, expanded pubis very comparable to the human ilium, which forms an extensive symphysis and affords strong ligamentous attachment for the plastron as well as a foundation for the iliac pillar which supports the carapace (Fig. 3).

In the crocodile, the ilium unites with the posterior hemapophysis to form the acetabulum, at the expense of the pubis, thus repeating the articular character of the coracoid in the shoulder girdle, while the long, slender pubis, placed anterior to the joint abuts against the abdominal sternum. The ilium is a short, broad bone extending beyond the two sacral vertebræ to which it is articulated, and it descends vertically to the acetabulum, of which it forms the upper half.

The ischium develops a strong, bent process from the fore part of the acetabular end to which the pubis is articulated. As it descends and inclines inward it becomes flattened and expanded and joins its fellow by an ischial symphysis. The slender pubis is directed forward and inward; no true obturator foramen is defined, but a wide opening exists between the bones (Fig. 4).

In birds the coalescence of the vertebræ to form the sacrum is carried to an extreme, a large number of the bones being involved, thirteen to seventeen fusing in a number of the species.

Generally the large sacrum forms the entire pelvic roof in birds, the ilia, ischia, and pubes being firmly attached thereto and so converting the pelvis into one complex mass of bone. The iliac, ischiac, and pubic elements are developed as distinct bones, but speedily coalesce at their point of junction about the acetabulum and usually elsewhere.

The ilium in birds is remarkable for its development in the direction of the axis of the vertebral column, extending its connection with many more segments than its own; it is accordingly long and narrow but thickened midway, where it constitutes the upper wall of the acetabulum.

The ischium is a long, narrow flattened bone, thickened where it forms the back part of the acetabulum, thinner and broader as it passes backward and generally placed parallel with its fellow.

The pubic bones are directed backward, with usually a convex curve outward and terminate freely or are united to the ischia above, the pelvis being an open one as a rule.

The pelvis of birds differs from that of cold-blooded vertebrates in the greater number of vertebral segments entering into its composition, and in their bony confluence. It differs from that of mammals by being unclosed by an anterior symphysis and by the widely perforate acetabulum.

The large size and brittle shell of the egg are the teleological conditions of the open pelvis and the transference of the weight of a horizontal trunk upon a single pair of legs, necessitates an extensive union of its segments. When the legs require to be pulled far and strongly back as in diving, the origins of the requisite muscles are extended far beyond the center of motion of the limb.

When the bird walks or hops, using the legs chiefly in grasping or perching, the pelvis is short and broad, especially behind; in certain cases the breadth may exceed the length (Fig. 5).

The form of the pelvis in the preceding classes, as well as in the lower orders of mammalia, plays no part in the function of reproduction, since in all of these forms the ova or young are so much smaller than the pelvic opening that their passage is not noteworthy. The exception to this generalization lies in birds which lay eggs, often of large relative size. In these animals, however, the pelvis is open below and anteriorly and thus provides for the egress of the large product of conception.

The absence of the symphysis is compensated for, as has been described, by the great size and extensive articulations of the sacrum.

It is only when the higher orders of mammalia are approached that the pelvic morphology becomes of importance with respect to parturition. It is necessary, however, to hastily survey the anatomy in all the vertebrate forms that an orderly review of the facts of pelvic evolution may be obtained.

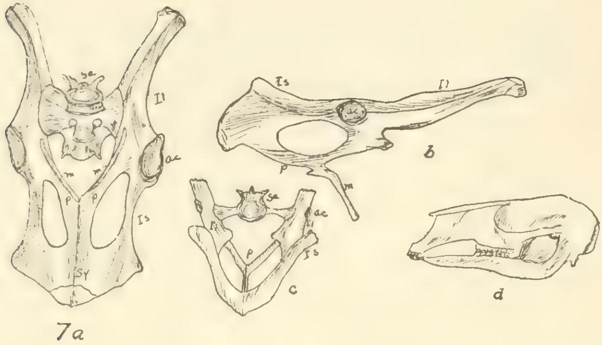
The lowest mammalian order is that called Monotremata, of which the ornithorynchus and the echidna are the only known representatives. In these animals the pelvis resembles that of reptiles in the length of time that the innominate bones retain their three-fold character.

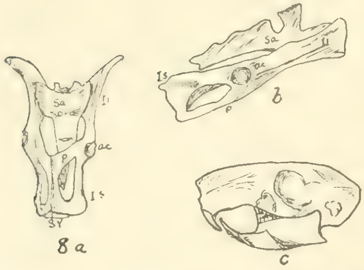
In the echidna the acetabulum is perforate as in birds.

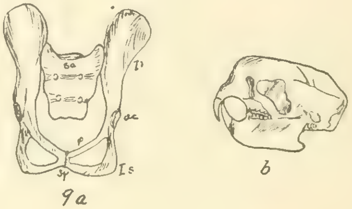
The entire pelvis is short, heavy and flat; the ilia being strong, short, triangular bones, their beams expanded and a trifle flared out. The ischia are also short, somewhat triangular bones, their tuberosities broad and blunt and directed sharply backward. The pubes are of smaller size and give off two spinous processes, one notably long. The pubes and ischia unite to form the obturator foramen and the short symphysis which closes the pelvis anteriorly.

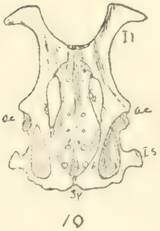
The marsupial bones are long, flat, triangular forms which are attached along what corresponds to Poupart's ligament, from the symphysis to the spinous process of the pubes. They are relatively long in this order and are directed forward and outward with the animal in its normal horizontal position (Fig. 6 *a*, *b*).

The pelvis of the order Marsupalia is characterized by certain essential morphological peculiarities. The entire structure forms a rough triangular prism, the parallel lateral walls formed by the two ilia and ischia (which lie in the same plane) and by the long symphysis pubis.









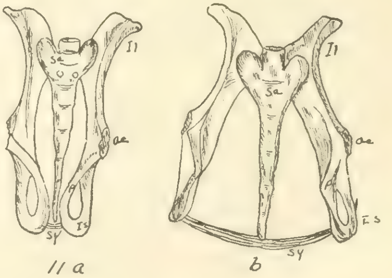


PLATE II.

FIG. 7.—Pelvis and skull of marsupial (Kangaroo, Macropus ruber), *a*, anterior view of pelvis, *b*, side view, *c*, outlet from behind, *d*, skull.

FIG. 8.—Pelvis and skull of a rodent (Cotia), *a*, anterior view, *b*, side view, *c*, skull.

FIG. 9.—Pelvis and skull of a rodent (Porcupine), *a*, anterior view, *b*, skull.

FIG. 10.—Pelvis of an armadillo (Dasypus 6 cinctus), anterior view. Note the fused, Avian character of the pelvis.

FIG. 11.—Pelvis of the guinea-pig, *a*, normal, *b*, during parturition, showing enormous stretching of symphysial ligaments. (Modified from Owens.)

The ilia themselves are also triangular prisms in form, with practically no flaring out of their crests. One exception to this form occurs in the wombat, in which the iliac bodies are considerably curved outward at their anterior extremities.

The ischia are heavy, angulated bones, their tuberosities not curved outward but maintaining the general prismatic form of the pelvis. The pubes are slender and possess very marked spines. The symphysis is a long joint, usually of a length about one-half that of the entire pelvis.

The sacrum is wedge shaped, the promontory not marked, the sacroiliac joint possessing considerable range of movement in the young animal. The marsupial bones reach their greatest development in this order and are, in form, two flattened, elongated, narrow, bony plates which are usually articulated with the pubis and are firmly attached to the pectinate ligament. Homologically these bones are the last pair of lumbar hemapophyses advanced to an osseous state. They exist in both sexes and serve as a point of origin of the pyramidalis muscle.

The essentials of the marsupial pelvis are the triangular outlet, the parallel lateral walls, the outlet five or six times the size required for the passage of the fetus, which is very small and immature; and the presence of the marsupial bones.

The angle of the true conjugate is about 80 degrees (Fig. 7, *a*, *b*, *c*, *d*).

The order Rodentia presents a large variety of creatures, about three-fourths of the known species of mammals being included in it, and in consequence the morphology of this great number of species is exceedingly diverse. There are rodents whose mode of life requires limbs fitted for rapid running, others that climb, some that burrow, some that leap, and a few that progress by a form of flight.

In the hares and rabbits the pelvis is relatively large, the ilia long and flattened and having a short sacral articulation, the joint being limited to one vertebra. The pubes are long and slender, meeting to form a long symphysis about two-fifths the entire pelvic length. The outlet is slightly ovate in section, or better triangular, the sides of the triangle somewhat convexly curved. The sacroiliac joint is freely movable, especially in young animals.

In the porcupine (Hystrix cristata) (Fig. 9, *a*, *b*) the ilia are truncate, their crests well widened, the sacroiliac joint a large synchondrosis with free motility. The pubes are slender and long, forming a very obtuse angle with the ilia and uniting into a very narrow symphysis, about one-tenth the entire pelvic length. The outlet is roughly circular, the anteroposterior diameter slightly longer than the transverse. The obturator foramen is very large, the tuberosities of the ischium are prominent bony points, and the pelvis is large and roomy throughout. The angle of the true conjugate is about 70 degrees.

In the guinea-pig (Cavia cobayia) the pelvis is long, narrow, and laterally compressed, the outlet being much smaller than the head of the mature fetus.

The ilia are long and narrow, the pubes slender and lying almost parallel with the ilia, the symphysis very short.

Prior to parturition the symphysial ligaments become soft and extensile and the ossa innominata, gliding on the sacroiliac joints, diverge at the symphysis to an enormous extent. After labor is complete the symphysial ligaments quickly undergo involution to their normal length and the pelvis resumes its usual state.

The fetus of the guinea-pig is far advanced at birth, some of the deciduous teeth being shed *in utero* (Fig. 11, *a*, *b*).

In those rodents adapted for a subterranean life the pelvis is characterized, as in other burrowing animals, by great narrowness, as its only striking peculiarity.

The rodent pelvis is difficult to summarize morphologically, by reason of the great diversity of form occurring in the many species of the order, but it may be said that here the pelvis is usually of a type rather higher in the scale than the other structural characteristics of the order would indicate. The outlet is more commonly ovate than rectangular, the ischia and ilia lie at a more marked angle to each other, and the true conjugate forms a lesser angle than is common in quadrupeds. The sacroiliac joint is, in general, freely movable (Fig. 8, *a*, *b*, *c*).

The order Insectivora, like rodentia, contains species fitted for leaping, burrowing, swimming and flying as well as for ordinary terrestrial progression. The pelvis among these animals is variable as to form, but in general is relatively large, the sacroiliac joint well marked, the symphysis short or entirely wanting, the pubes being separated.

In the hedgehog, for example, the pelvic outlet is large, the sacrum narrow, forming a long articulation with the ilia, which leave the spinal column at an angle of about 130 degrees. The symphysis is short and slight, the sacroiliac joint freely movable.

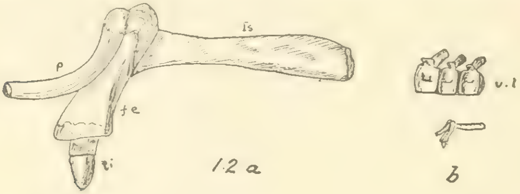
In the bats the ilia are narrow, subcylindrical bones, firmly united to the sacrum and lying parallel to the spinal column. The pubis is continued on a line with the ilium to the symphysis, which is but slightly closed in the male and remains entirely open in most female bats. The ischia join the last sacral vertebra and help bound a sacrosciatic foramen. The shallow acetabula are directed outward and backward.

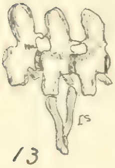
The order Bruta is of some especial interest from its direct relationship with some of the giant fossil mammals, the Megatherium and the Glyptodon groups. One family, the armadillos, are peculiar in that anchyloses are found in great number and in unusual regions among them. The pelvis is formed of the coalescence of the ilia and ischia with the sacrum, which is formed of the fused eight sacral vertebræ, which, rather than decrease in width as the caudal appendage is approached, progressively grow wider to form a long, bony union with the ischia and the pubes. The tuberosities of the ischia and a long, bony process at the anterior portion of the ilia curve outward and upward, to form firm bony supports for the carapace with which these animals are invested. The pubes are long and slender and unite in a very slight symphysis. The sacrosymphysial angle is quite 80 degrees. No movement of any pelvic articulation is possible and in this respect the structure is very comparable to that of birds (Fig. 10).

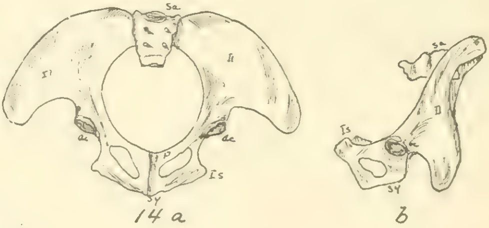
In the sloths and their relatives, the extinct mylodon, the pelvis assumes a different contour. Here the alæ of the ilia are flared out and expanded as in a pelvis of the human type. The sacroiliac joint is fixed, the long sacrum being fused with the ilia and the ischia. The pubes are long and slender, the symphysis extremely short. The pelvic outlet is almost circular.

Among the whales, comprising the order Cetacea, the pelvis is but rudimentary and there is never any evidence of vertebral confluence to form a sacrum. The pelvic bones, two in number, are larger in males than in females, and seem to serve as a point of origin for the erector penis and erector clitoridis muscles, as their only function. They are homologues of the ischia. In Balena mysticus there is found, beside the ischium, a smaller, slender, curved bone which represents the pubes. The junction of the two bones forms a rudimentary acetabulum to which is ligamentously suspended a bone of equal length to the pubes, but thicker and terminating in a transversely extended convex surface, to which is suspended a smaller rudiment of a tibia. This is the most rudimentary form of limb appendage known in mammalia, and the little bones forming it (8.5 inches in length in a whale of 28 feet) are suspended beneath the last two lumbar vertebræ, which may thus be regarded as answering to the sacral in quadrupeds (Owens) (Fig. 12, *a*, *b*).

In the marine order Sirenia, represented by the manatee and the dugong, the hind limbs are absent, as in whales, and the pelvis is also rudimentary. It is formed by an extension of ossification from the pleuropophysis of the second lumbar vertebra, which ossification is the homologue of the ilium. To this is attached a smaller bone, the ischium which unites with its fellow of the opposite side,







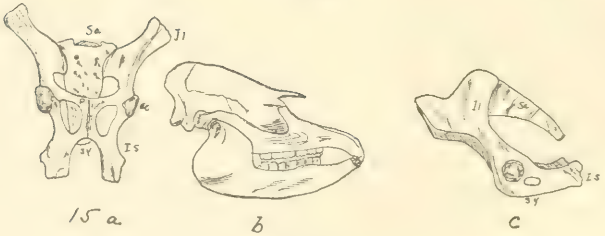


Plate III.

Fig. 12.—Pelvis of the whale (Balena mysticus), *a*, side view, *b*, view *in situ*, showing relation to vertebral column.

Fig. 13.—Pelvis of the dugong. Order Sirenia.

Fig. 14.—Pelvis of the elephant, *a*, anterior view, *b*, side view.

Fig. 15.—Pelvis and skull of the tapir (Tapirus americanus), *a*, anterior view, *b*, skull, *c*, side view.

forming a symphysis ischii. There is no evidence of a femur (Fig. 13).

The order Proboscidæ, the elephants, possess pelvic characteristics peculiar to themselves. The entire pelvic girdle is massive and strong, and lies directly vertical to the axis of the spinal column, the ilia coming off the sacroiliac joint at an angle of almost 90 degrees. The ilia are large, fan-shaped bones, their alæ very markedly expanded, the anterior superior spine lying at the level of the acetabulum. They are sharply concave anteriorly and correspondingly convex on their posterior aspect; the bodies are extremely short. The ischia are short massive bones, their bodies lying parallel to the direction of the ilia, the tuberosity well marked. A line drawn from the tuberosity of the ischium to the middle of the crest of the ilium would pass through the posterior surface of the acetabulum. The pubes are short and unite with the ischia to form a long, strong symphysis which lies at an angle of about 30 degrees with the vertebral column. The vertical position of the pelvis is largely due to the very short bodies of the ilia; the angle of the true conjugate is less than 20 degrees. The sacroiliac joint is long and heavy and possesses moderate movement in young animals. The acetabula are directed directly downward thus transferring the weight immediately to the head of the femur. The outlet is ovate. In the specimen examined the entire pelvic length was 4 feet, the symphysis 18 inches and the true conjugate 19 inches, the transverse 17.5 inches.

The crests of the ilia were 28 inches long (Fig. 14, *a*, *b*).

Perissodactyla is an order of mammalia containing groups of creatures widely divergent as to their external characteristics; for instance, the rhinoceros, tapir, and horse (Figs. 15 and 17).

In the rhinoceros the pelvis is of good size and directed vertically to the vertebral column. The ilia are flat, fan-shaped bones, somewhat concave posteriorly but flat anteriorly. The short, heavy ischia form a slight angle with the ilia, their tuberosities spreading apart to form a wide pelvic outlet. The symphysis is short, the ischia playing but a small part in its construction. The acetabula are directed outward and downward. The angle of the true conjugate is less than 10 degrees.

In the horse the pelvic constituents are much the same as in the preceding species, but vary in the much greater length of the iliac bodies, which lengthening greatly increases the obliquity of the pelvis, it making an angle of about 135 degrees with the spinal column as opposed to almost 90 degrees in the rhinoceros.

The ilia are fan shaped and flat, their bodies long and slender. The ischia are strong and straight, the pubes more slight, the symphysis a long joint about one-half the entire pelvic length. The angle of the true conjugate is about 50 degrees. The sides of the pelvis are parallel to each other, the outlet ovoid. The pelvis of the horse closely approaches that of the ungulates in its general characteristics (Fig. 17).

The order Ungulata, or Artiodactyla as formerly called, presents among its wide range of species, animals varying greatly in their external appearance, though the morphology of the pelvis is singularly uniform.

This order contains the pachyderms and the ruminants.

The hippopotamus possesses a heavy and massive pelvis, relatively large in size. The sacrum is broad and flat, the ilia with expanded alæ, curve upward from the sacroiliac articulation to reach almost the level of the sacrum itself. The iliolumbar angle is about 150 degrees. The ischia are heavy, their tuberosities expanded into a broad plate of bone. The pubes are more slender and form with the ischia a strong symphysis.

In the swine the pelvis is relatively longer and narrower than in the hippopotamus, but of the same general character.

In the ruminant members of the order the pelvic girdle is characteristic. The sacrum consists of four fused vertebræ, their spines coalescing into a ridge or crest. The sacroiliac joint is large but possesses free motion. The iliolumbar angle varies somewhat but averages around 145 degrees. The ilia have their alæ expanded and flared out somewhat anteriorly (ventrally); their bodies are long and slender, with some increase of bony tissue where they meet with the ischia and pubes to form the acetabulum. The bodies of the ischia lie in the same axis as the ilia; their tuberosities are broad and expanded, forming wide bony plates which are directed usually parallel to the caudal vertebræ. The pubes are slender and short, uniting with the ischia to form a long, strong symphysis of two-fifths the entire pelvic length.

At the posterior end of the symphysis the ischia are separated, leaving a large, V-shaped notch at the posterior pelvic rim, the V bounded on each side by the tuberosities of the ischia.

The pelvic outlet is almost rectangular, the transverse diameter being to the anteroposterior as 12 to 19.

The lateral sides of the pelvis are nearly parallel to each other, the outlet resembling, in section, a sort of square trough. The obturator foramen is of good size and the acetabula are carried far backward by the great length of the bodies of the ilia (Fig. 16, *a*, *b*, *c*).

In the Carnivora the pelvis is fairly uniform in the several species with the exception of such aberrant forms as the seals and walruses.

The lion may be taken as a general representative of the order. Here the pelvis is relatively a rather small structure, though very heavily and powerfully made. The sacrum is a wide, heavy bone, consisting of three fused vertebræ, their spines separate and long. The sacroiliac joint is strong and of large size. The ilia are broad bones, shaped somewhat like a paddle blade, concave on their external surface and lying almost parallel to each other, their alæ slightly divergent. The bodies or beams of the ilia are wide and massive and the growth of bone surrounding the acetabulum is markedly strong and solid. The ischia lie parallel to the ilia and are slighter, their tuberosities well marked and spread apart a little.

The pubes are short and stout, the symphysis a very long, strong joint of more than two-fifths the entire pelvic length. The rami of the ischia are wide, bony structures forming a trough-like outlet. The pelvic cavity is roughly rectangular, the outlet ovate. The angle of the true conjugate is 75 degrees. The acetabula are directed laterally; the obturator foramen is of large size, the ischiatic notch only indicated by a small spine (Fig. 19, *a*, *b*, *c*).

In certain species considerable variation from the typical form occurs.

In the raccoon the ischia are widely separated, a large V-shaped opening appearing at the posterior end of the symphysis, and the pelvis being very flat from before backward.

In the badger the symphysis is exceedingly short, the pubes very sloped, the ischia flaring widely apart.

The Pinnipedia, or seals, must be grouped with the carnivora as they are morphologically of the same type but have undergone extensive structural modification to suit their marine environment. In them the pelvis is remarkable for the stunted development of the ilia and the length of the ischia and pubes. The symphysis is short and feeble and the symphysial ligaments have the same property of enormous elasticity during parturition noted in certain rodents.

The general characteristics of the carnivorous pelvis may be summed up as consisting of the long, strong symphysis, the parallel lateral pelvic walls, the great sacrosymphysial angle, and the marked separation of the bodies of the ischia.

The sacroiliac joint is in general moderately movable.

In the order Quadrumana a great change takes place in the construction and the mechanics of the pelvis. The monkeys habitually assume the erect posture for varying periods of time and, as many species are arboreal in their habits, and spend much time swinging

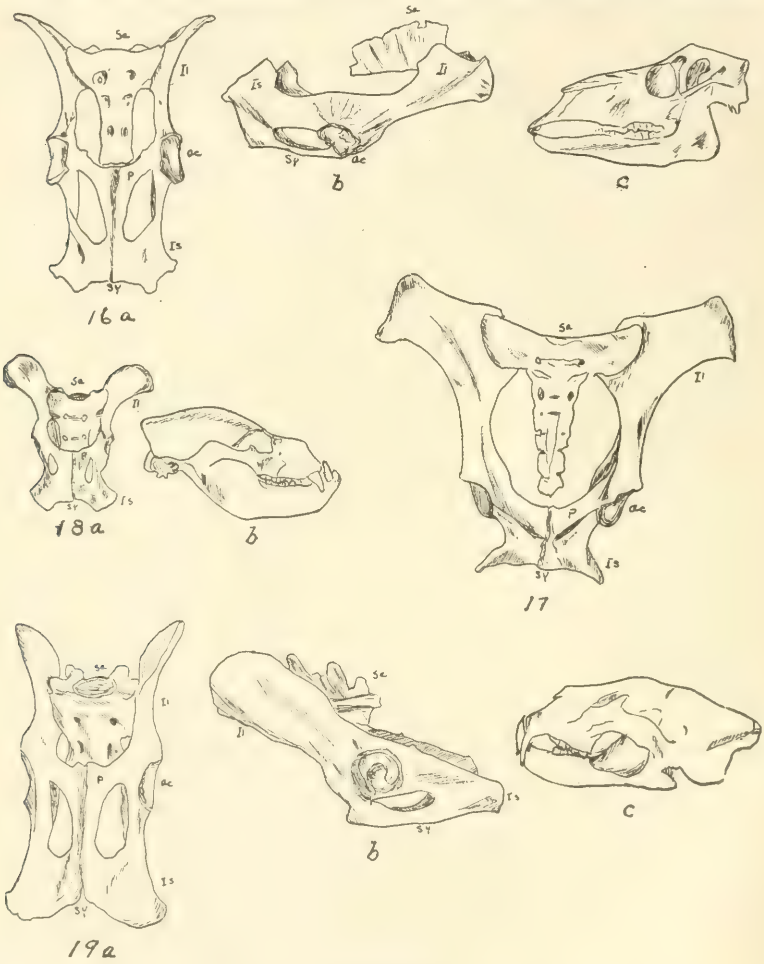


PLATE IV.

FIG. 16.—Pelvis and skull of a deer (Rusa unicolor), *a*, anterior view, *b*, side view, *c*, skull.

FIG. 17.—Pelvis of a zebra, anterior view.

FIG. 18.—Pelvis and skull of a bear (Ursus labiatus), showing relatively small pelvis as compared with adult skull.

FIG. 19.—Pelvis and skull of a lioness (Felis leo), *a*, anterior view, *b*, side view, *c*, skull.

from their hands in the tree-tops, the upright position becomes an almost constant one among these varieties.

In the lemurs, a group about which there has been some discussion among naturalists, some classing them with the insectivora, the pelvis is narrow, feeble and small.

The ilia are long and narrow, articulating with two vertebræ of the slender sacrum. They form an angle of 140 degrees with the lumbosacral vertebral axis. The slender pubes leave the ilia at almost a right angle, forming a very short, weak symphysis. The ischia are curved, short, and present well-marked tubercles, and the entire pelvis bears a strong resemblance to that of bats.

In the macaques the pelvis is long and relatively large, the sacrum wide and wing-shaped, the ilia articulating with its first and slightly with its second vertebra. The joint is short, the articular surface small. The ilia are very long and of an oar-blade shape, their anterior surfaces curved sharply outward until they occupy a plane almost horizontal to the vertical axis of the animal. They make an angle of 160 degrees with the spinal column. The ischia lie almost in line with the ilia, their large, expanded tuberosities extended well backward and widely separated. The pubes are long and make a right angle with the ilia; the symphysis is short, about one-sixth the entire pelvic length.

The acetabula are directed slightly forward, a small curve in the body of the ilia bearing witness to the upward pressure of the femora upon them.

The angle of the superior strait is about 60 degrees; the pelvic outlet is oval, the anteroposterior diameter greater than the transverse (Fig. 20, *a*, *b*, *c*). The structure taken as a whole begins slightly to approach the human type.

In the chimpanzee (troglodytes niger) a marked change is at once apparent. The sacrum is wedge shaped, its articular surface large, and occupying the bodies of three sacral vertebræ. The ilia are large and wide, their alæ much expanded and concave anteriorly, causing the pelvic cavity to assume something of the basin form. The bodies of the ilia are much shorter, relatively, than in the preceding species, the acetabulum farther forward.

The ischia are stout, the tuberosities flattened, separated and directed well downward. The pubes form an angle of about 20 degrees with the ilia; the symphysis is short and its axis parallel with the lumbosacral line. The obturator foramina are small, the outlet ovoid, its anteroposterior diameter greater than the transverse one.

The angle of the true conjugate is 65 degrees. The large sacroiliac articulation possesses but little motion (Fig. 21, *a*, *b*).

In the gorilla (Gorilla gorilla) the pelvis rather closely approximates the human type. The sacrum is wedge shaped, composed of five fused vertebræ and presents a distinct concavity anteriorly; its articular surfaces are large and rough, directed slightly backward. The alæ of the ilia are widely expanded, their crests forming a large arc, though the widening is almost entirely forward of the sacrum and not behind it as in the case of man. The ilia are concave anteriorly and convex posteriorly, and form an angle with the spinal column of 150 degrees.

The pubes are directed forward, forming an angle of 100 degrees with the ilia. The ischia are heavy, their tuberosities massive and point downward; the acetabula are faced outward and slightly backward. The pelvic contour is oval, the anteroposterior diameter still greater than the transverse, but the ratio much more nearly equal than in any preceding species. The angle of the true conjugate is 70 degrees, the interpubic angle obtuse (Fig. 22, *a*, *b*).

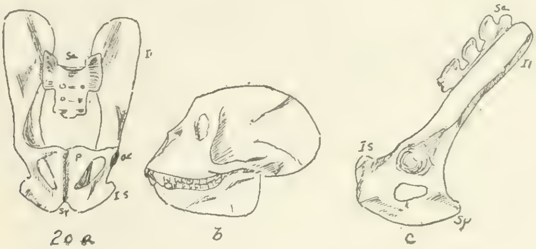
In man the especial human characteristics of the pelvis are most marked. The sacrum is a broad, wedge-shaped bone, its anterior surface deeply concave, its articular facets relatively much larger than in any other mammal, and roughly quadrate in form. The ilia are wider than their length, the great expansion of their alæ posteriorly, to afford support for the great erector muscles of the trunk, being a specific morphological feature. The bodies or beams of the ilia are more curved inward than the apes, and this fact, together with the decrease in the interpubic angle accounts for the extension of the transverse diameter of the pelvis in man until it becomes considerably longer than the anteroposterior one, this being also peculiar to the human species.

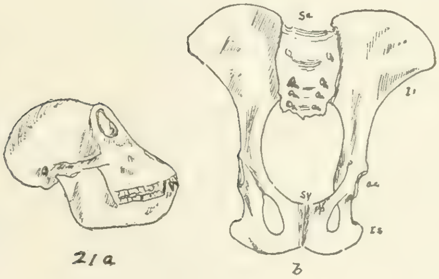
The pubes are short and stout, the iliopubic angle acute; the acetabula are directed outward and backward. The ischia are short and heavy, their tuberosities massive, convex, and extending along the outer surface of the ischia almost to the acetabula.

The pelvic contour is oval, the greater diameter being the transverse; the symphysis is short and flat and the entire bony cavity of the pelvis is in one plane. The angle of the true conjugate is 55 degrees (Fig. 24).

The fetal pelvis differs from the adult in many particulars.

The bodies of the ilia are much more straight, their sides tending to lie parallel to each other as in quadrupeds. The interpubic angle is more acute, leaving a slight tendency to the triangular outline of the cavity.





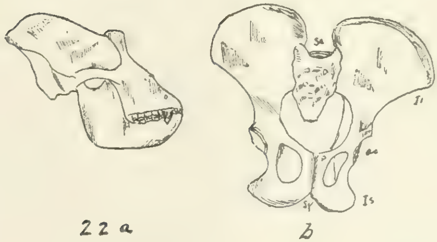


PLATE V.

FIG. 20.—Pelvis and skull of a monkey (Macacus), *a*, anterior view, *b*, skull, *c*, side view. Note changes in pelvic architecture and increase in facial angle.

FIG. 21.—Pelvis and skull of chimpanzee (Troglodytes niger).

FIG. 22.—Skull and pelvis of gorilla (Gorilla gorilla). Note approximation to human type.

The ilia are less expanded posteriorly and the concavity of the sacrum is less marked. It is only when the developmental forces have acted upon the pelvis during the years of growth and of bony coalescence that the ultimate form of the human pelvis is fixed (Fig. 23).

An analysis of the course of evolution in the mammalian pelvis reveals the fact that gross structural changes are not marked throughout the quadruped orders with a few exceptions.

In the order bruta, of which the armadillo may be taken as an example, there is a distinct reversion to the avian type, the fused sacrum and ilia and the general immobility of the pelvis.

In certain rodents the pelvic girdle assumes a form apparently much higher in the scale of life than the animal itself, but broadly speaking the quadruped pelvis may be described as a roughly rectangular structure, lying in a generally horizontal plane, with a slight slope downward posteriorly. The false pelvis is almost entirely wanting, there being practically no part of the bony tissues above the brim with the exception of the small upper portion of the ilia.

The ilia are usually comparatively long, narrow bones, their beams roughly parallel, their alæ commonly flared out, but never markedly so, their bodies narrow.

The ischia are long, their bodies continuous with and in line with the ilia, the tuberosities generally in the same vertical plane as the iliac crests.

The symphysis pubis is a long joint, averaging from two-fifths to three-fifths the entire pelvic length. The angle of the true conjugate, from the promontory of the sacrum to the top of the symphysis, is much greater than in man, 70 to 80 degrees being not infrequent.

The increased length of the symphysis naturally causes a wide variation between the true and the diagonal conjugate diameter. Whereas in man the true conjugate averages 11 cm. and the diagonal conjugate 12.75 cm., a ratio of about 110 to 128; in the lioness the true conjugate is 11 cm., the diagonal 22 cm., ratio of 1 to 2. In the deer the proportion is as 14 to 26, in the great kangaroo 10 to 19, in the macaque, 7 to 10, and in the gorilla it is as 18 to 22.

It will be seen that in the passage of the fetus under the promontory of the sacrum, it meets with no bony obstacle below, since the entire promontory lies anterior to the symphysis and has only soft tissues opposite it. The pelvic contraction ring begins only when the fetus has passed under the symphysis and becomes inclosed within the lateral bony walls.

For these reasons the true conjugate is in no sense a measure of the pelvic size, since the difficulty in passage lies in the vertical dorsoventral diameter. The form of the pelvic inlet is only of importance so far as it concerns the vertical diameter.

It follows that in quadrupeds the possible rotation of the sacrum on its sacroiliac joint is of the greatest value both in increasing the vertical diameter and by widening the pelvis by a separation of the ilia.

This movement of the sacroiliac joint varies greatly among different species and is most marked in young animals during their first delivery. Later in life the joint becomes anchylosed.

The shape of the pelvic brim varies exceedingly among the orders and species. In the lower forms, as the kangaroo, it is of the shape of a narrow triangle; the triangular form becomes more and more widened as higher animals are reached, until, the sides becoming more and more concave, the brim becomes ovoid in the ungulates, the broader portion being above.

In all quadrupeds the anteroposterior (dorsoventral) diameter is longer than the lateral one.

The size of the pelvic cavity varies not so much with the relative sizes of the particular animals as with the number and form of the young.

It is obvious that in uniparous animals, as the mare, cow, etc., where one or at most twin fetuses are produced at a birth, a larger birth canal is required than in multiparous animals, as the dog or swine, where the young are multiple and naturally of relatively smaller size.

The pelvis in quadrupeds is constantly subjected to great forces, which must be in equilibrium at all times.

First there is the thrust upward, backward, and slightly inward of the femora upon the acetabula, this force being enormously increased when the animal is running or leaping. To oppose this thrust there is the sacroiliac articulation, the flexible and elastic vertebral column, and the long, strong symphysis.

If the quadruped pelvis be resolved into its mechanical elements, the acetabula will be the point of application of a force directed upward, backward, and inward; the rami of the pubes and the ischia, together with the long symphysis, form an almost rectangular truss to withstand this force. The ilium is not permitted to bend inward by reason of the massive deposits of bone about the acetabulum.

The strong superior sacroiliac ligaments hold the ilia firmly in contact with the sacrum and, together with the wide articular surface of that bone, act to prevent undue rotation backward and inward of the ilia upon the sacrum, when force is applied at the acetabulum.

The resultant action of all these forces is to maintain the straight-sided, long pelvis, the symphysis taking most of the leg thrust, while the sacroiliac articulation acts as a brace and, to use a nautical term, a "preventer stay" (Fig. 25).

The shock of running and leaping efforts are not resisted by the pelvic joints alone, but the whole vertebral column assists in dissipating the force by alternate flexion and extension. A slight rotation of the ilia upon the sacrum does occur, but the movement is small in degree.

By a study of the drawings of the quadruped pelvis it will be seen that there can be no tendency to unequal movement of that structure, that is, one side of the pelvis rotating with the sacroiliac joint as a center and a separation or sliding movement of the symphysis, that articulation being of such length and strength as to preclude any possibility of shearing or pulling apart. The importance of this fact will be seen when the forces involved in the maintenance of the upright position are studied.

As the mammalia grew in intellect and evolution progressed, the tendency to abandon the horizontal position became more and more marked until the erect posture was attained by man.

The condition of the pelvic dynamics during the transition stage is well illustrated by the higher monkeys. In these animals the habitual carriage of the body is one of about 60 degrees inclination of the vertebral column with the horizon, and in consequence there is distinct change in the action of the forces involved.

The weight of the body presses the sacrum backward and downward, tending to force the ilia apart and to widen the pelvis. This force is opposed by the upward thrust of the femora, which, when the animal is standing, lie at an angle of about 30 degrees to the long axis of the pelvis. The displacement of the sacrum downward is resisted by the strong posterior sacroiliac ligaments which are attached to the posterior surface of the body of the ilium. The resultant action of all of these forces is to press the acetabula forward of their usual position in quadrupeds by the bending strain upon the bodies of the ilia caused by the pressure of the femora upward and forward, and the push of the sacrum downward and backward (Fig. 26).

These same forces next tend to twist the alæ of the ilia outward on their bodies, which are still very long, so that the anterior portion of the alæ are spread outward, the posterior portion being firmly held by the sacroiliac ligaments.

The pubes and the ischia, being pushed upward with the acetabula, form a sharp angle with the bodies of the ilia, this reaching a right angle in many monkeys. The symphysis being pushed upward is shortened and the angle of the true conjugate decreased.

The result of these changes in the contour of the pelvis upon its function as a parturient tract are at once apparent. The birth canal is growing shorter and the sacrosymphysial angle less, consequently the canal is developing into a bony circuit having its whole inlet in the same plane, through which the fetal head must pass. No longer is the head well beyond any obstruction caused by the promontory before the symphysis is reached, but both walls of the pelvis are reached at the same time.

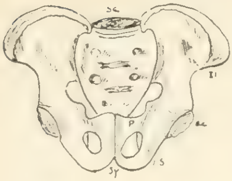
The lateral walls of the pelvis are still nearly parallel to each other, though some concavity develops and internal rotation is not yet necessary to bring about molding of the fetal head into its birth passage.

The shortening of the symphysis and the effort of a force acting in line with its articular surface as does the pressure upward of the femora in monkeys, tends to cause that side of the joint to which this pressure is applied to slide upward along its fellow of the opposite side, the symphysis giving way. Such mishap is resisted by the density of the ligaments composing the sacroiliac joint which hold the ilia firmly against the sacrum and take the strain off the symphysis. It follows that the former articulation must be a powerful one and incapable of motion to any appreciable degree.

With the attainment of the erect position in man, the mechanics of the pelvis were entirely altered, many new problems presenting themselves and requiring modifications of architecture to make the continuance of the upright position practicable.

The weight of the body, which in quadrupeds is distributed between two planes separated by the entire length of the trunk, *i.e.*, the fore and hind limbs, is in bipeds carried on one plane and supported at but two points. The increased strain is great when the animal is not moving, but when the shocks of motion are superadded the increase in strain is enormous.

In man the pelvis must directly support the entire weight of the body, the strain falling upon the sacroiliac articulation, the substance of the iliac bodies, and the bony masses about the acetabula. In addition the pelvis must be firm enough to offer rigid attachment to the powerful muscles which hold the trunk erect.



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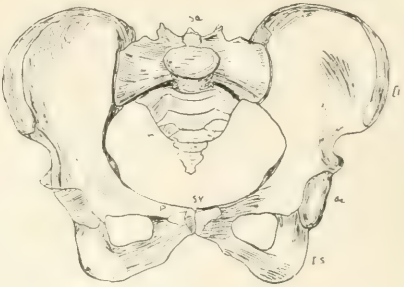

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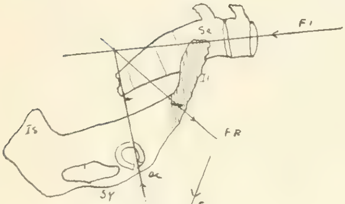

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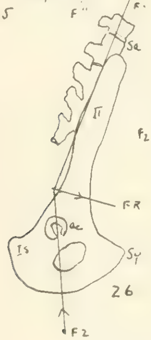

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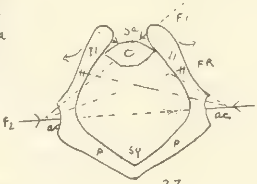

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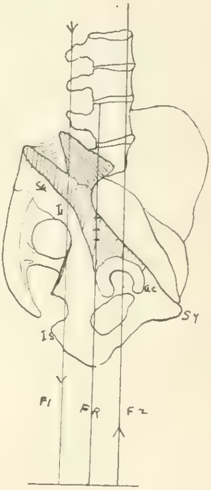

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PLATE VI.

FIG. 23.—Pelvis of a human fetus.

FIG. 24.—Adult female human pelvis.

FIG. 25.—Forces acting upon a quadruped pelvis. F_1, force along vertebral column and sacrum. F_2, the opposing pressure of the femora upon the pelvis. FR, the resultant of the two forces acting on the long body of the ilium.

FIG. 26.—The forces acting upon the monkey pelvis. F_1, the push downward and backward upon the sacrum. F_2, the opposing thrust of the femora, FR, the resultant force acting to twist the body of the ilium outward and forward.

FIG. 27.—A diagrammatic section through the human pelvis at the sacroiliac articulation. F_1, the force exerted by the posterior sacroiliac ligament, pulling the posterior margins of the ilia together and forcing the acetabular ends apart, the sacrum acting as a fulcrum. F_2, the force exerted by the push of the femora inward. FR, the resultant of the two forces acting on the weakest portion of the iliac body and tending to curve it outward.

FIG. 28.—Longitudinal section through the sacroiliac articulation. (Modified from Owens.) F_1, the weight of the body pushing downward. F_2, the upward thrust of the femora. FR, the resultant of the forces, tending to bend the ilia upward and forward at their weakest portions.

Further, the weight of the abdominal viscera falling into its cavity, necessitates a tense retaining tissue to be fastened around the whole circumference of the pelvis, the tissues composing the abdominal walls.

As a result of these requirements, the forces involved both in the statics and the dynamics of the human pelvis are complex and interwoven with each other.

The ilia may be considered as long bones, strengthened by the wide buttresses formed by the expanded alæ. They lie obliquely to the body axis, pointing downward, forward, and outward, and are subjected to opposing forces acting in different directions upon their two ends, the middle portion of the bone resting on the raised middle portion of the articular facet of the sacrum, as upon a fulcrum. The forces acting, not in the direction of the axes of the ilia but diagonally to it, throw the greatest possible strain upon these bones.

The sacroiliac articulation presents many powerful ligaments to hold its component structures in apposition, the ones of greatest importance in determining the contour of the pelvis being the superior or posterior sacroiliac ligaments, which pass upward and outward from the posterior rough portion of the lateral articulating surface of the sacrum, to the corresponding portions of the ilia, between their articular surfaces and the posterior processes. With this conception of certain details of the construction of the human pelvis, the forces to which it is subjected may be considered.

The chief forces present are two in number, acting in direct opposition to one another and usually in equilibrium: first, the weight of the body transmitted vertically downward to the sacrum and through it to the ilia by the posterior sacroiliac ligaments, just described; and second, the counterforce exerted by the pressure upward and inward of the femora upon the acetabulum and the bony masses surrounding it.

If the action of the downward force be analyzed, it will be seen that as the sacrum tends to move downward and to rotate forward in the direction of the spinal column (as evidenced by the line of the lumbosacral axis) a strong pull is exerted upon these posterior sacroiliac ligaments, which, being attached to the posterior edge of the alæ of the ilia, tend to draw the alæ inward, on the articular facet of the sacrum as a fulcrum, and, in consequence to throw outward the acetabular end of these bones. If this force were unresisted the pelvis would increase enormously in width, at the expense of the anteroposterior diameter, for the pressure exerted by the body weight far exceeds any tensile strength that might be developed in the tie beams of the pelvis, the symphysis pubis and the rami of the pubes and the ischia.

But this force is resisted by one of equal power and directed upward and inward to counteract the pressure downward and outward.

The second force is that applied by the femora upon the region about the acetabulum. The upward direction is derived from the necessity for keeping the body erect, the inward direction arising from the pull of the great muscles which swing the leg inward and which hold the head of the femur so closely within the cotyloid cavity. The resultant of this upward and inward force may be seen in the direction of the neck of the femur and is directly opposite to that exerted upon the sacrum (Fig. 27).

It must be remembered that in the adult and completely ossified pelvis, even these forces could not produce marked changes in the contour of the structure, but, acting as they do upon the growing bones, at a time when the three segments of the ossa innominata are still separated by fibrocartilage and the entire osseous tissue is to a certain extent plastic, well-defined changes do occur.

If the action of the forces upon the developing pelvis be summed up, it becomes apparent that the ilia are dragged together at their posterior extremities and pushed apart at their acetabular ends. This separation is resisted by the push upward and inward of the femora and, as a resultant of these two forces, the beams of the ilia curve in a segment of a circle at their thinnest and weakest portions, about midway between the acetabula and the sacroiliac articulation. This bending of the ilia and the thrusting outward of their cotyloid extremities take place more readily in females than in males by reason of the more fragile bony construction, an important factor in the determination of the characteristic changes noted in the female pelvis.

By the bending of the ilia the symphysis is drawn posteriorly closer to the sacrum and the interpubic angle (that included between the long axes of the pubes) is decreased.

The pelvic cavity thus becomes considerably widened in the transverse diameter, equally narrowed in its anteroposterior diameter, and in form becomes broadly oval, the symphysial (interpubic) angle becoming negligible and the triangular element in the contour being almost obliterated.

It has been stated that the forces operative in the human pelvis are in equilibrium, but this is not absolutely true, since the pressure upon the sacrum does slightly exceed the resistance of the femoral thrust, so that the gradual increase of the transverse diameter at the expense of the anteroposterior one may occur.

Should the sacroiliac articulation be destroyed from any cause, the pressure of the femur on the corresponding side is not resisted and the iliac beam is forced inward, the obliquely contracted pelvis of Nägele resulting. Should both sides of the joint be destroyed, the pelvis of Robert is an inevitable result (Duncan).

The chief differences between the infantile and the adult pelvis are such as result from these actions and reactions of powerful forces constantly exerted in greater or less measure.

Thus in the infant the anteroposterior diameter is greater than the transverse; the symphysis pubis forms an acute angle, making the cavity of the pelvis triangular in outline; the ilia are flat bones nearly straight from their alæ to their acetabular ends, and the ilioischiatic angle is very small, the bones being almost in line.

The infantile pelvis, then, more nearly approximates the quadruped type and is not at all dissimilar to that of the highest apes (Fig. 23).

If it be considered that the changes between the infantile form and that of the adult are produced almost solely by the action of the forces occurring in the maintenance of the upright position, the conclusion is inevitable that these changes in contour are evolutional in origin.

As to the differences between the male and female type of pelvis, this is found in all mammals, in some to a greater extent than in man. While it is due, as has been detailed, to the different character of the bones themselves, the determinant factor is natural selection. Only those females whose pelves accommodated the fetus were able to reproduce themselves successfully, and this type obviously survived. If to this be added the factor of sexual selection, the inherent tendency on the part of the best males to seek as mates those females best qualified to bear young, there is given ample ground upon which to explain this morphological variation.

The ultimate result of the change in forces brought about by the assumption of the upright position is as follows: first, to develop a forward inclination of the sacrum and a concavity in its surface anteriorly; second, to greatly increase the iliopubic and ilioischiatic angles; third, to cause the acetabula to move forward of the lumbosacral axis; fourth, to shorten the bodies of the ilia and to develop in them a regular curved surface, its concavity facing forward and inward; fifth, to decrease the interpubic angle and accordingly to remove the triangular quality of the pelvic contour; sixth, to increase the transverse diameter at the expense of the anteroposterior, and seventh, to greatly decrease the sacrosymphysial angle, with the result that the entire pelvic cavity lies in one plane (Fig. 28).

The effects of forces in alterations of the pelvic architecture may be seen in their several stages by the observation of the mammalian pelvis in the course of its evolution and development. The transitions in form are very gradual, but their gradations are well shown in the characteristic forms which have been described; the quadruped, monkey, anthropoid ape, human fetal, and adult human type.

It is not within the province of this study to consider in detail the deformities of the pelvis, but it is readily apparent that the great majority of such deformities are developmental in their nature and are due either to an excess of one of the active forces or to a deficiency in the passive resistance of the bones and joints.

The occurrence of the Nägele and Robert pelves have been described as due to destruction of one or both sacroiliac joints, thus preventing the outward rotation of the ilia to oppose the pressure of the femora. In like manner the rachitic and osteomalacic pelves are caused by deficiency in the osseous tissue which permits the pressure inward and upward of the femora to bend the growing bones inward, even though the sacroiliac articulation throws the acetabular ends outward in a normal manner.

The individual varieties of pelvic deformity might all be analyzed in the same manner and their origin be found in some fault in the pelvic mechanics.

Besides the assumption of the erect position, it has been stated as a portion of this thesis that the enormous increase in intellect with its correspondingly great frontal development of the cranium and the growth backward of the occipital lobes has had a marked effect upon the mechanism and the difficulties attending parturition in the human species.

The presenting fetal part in any animal must be conical in form in order to obtain the best mechanical advantages for egress from a resisting passage, and in the lower mammalian orders, from the monotremata to the quadrumana, the facial angle is so low that the conical form of the cephalic presentation is best maintained by extension of the fetal head, the pointed snout in advance. The absence of a marked posterior cerebral lobe permits the posterior portion of the skull to merge into the neck, when in extension without any marked prominence of the occiput. The resulting long wedge then passes with ease through the parallel-sided outlet and along the trough formed by the long symphysis. (See figures of skulls accompanying pelves.)

When in the higher monkeys, the anthropoid apes, and man the facial angle rises above 45 degrees and the occipital lobes cause a development backward of the vault of the cranium, the extended head does not present as a cone but as an irregular surface with the three several obstructive points of the chin, the forehead, and the arched occiput.

In these animals the head is extruded in extreme flexion, the occiput presenting, the chin sunk into the root of the neck, and the forehead offering no obstacle to the passage but lying in the long axis of the fetus. Furthermore, owing to the bony cavity of the human pelvis lying in one plane, and in consequence of the posterior part of this cavity being occupied by the maternal soft tissues, it becomes necessary to rotate the fetal head from an oblique to an anteroposterior position in order to facilitate egress. This is the mechanism of internal rotation which, as has been stated, is at best a compromise on the part of nature to balance the changed pelvic contour and the enlarged cranium, with the mechanical processes of parturition.

In the light of the facts herein presented, it seems a reasonable and just conclusion that the mechanical difficulties which occur during parturition in the human female may be entirely explained by a consideration of the method of development of the human pelvis, and that the present form and type of that pelvis is a direct result of the alterations brought about by the very gradual evolution of man from his immediate and remote vertebrate ancestors.

348 South Fifteenth Street.

EXPLANATION OF THE FIGURES.

In all the drawings the same identification marks will be used, as follows:

Sa = sacrum
Il = ilium
Is = ischium
P = pubis
Sy = symphysis
M = marsupial bone
F = fin
cc = coccyx
Fe = femur
Ti = tibia
ac = acetabulum
F1 = force one
F2 = force two
FR = resultant of forces

HETEROPLASIA IN CARCINOMA UTERI.*

BY

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(With four illustrations.)

Squamous metaplasia in carcinoma corporis uteri is a common occurrence. The present case, however, is not of that type, and presents interesting questions of combinations of tumors, and questions of the principles of misplaced epithelium in general.

The patient, an Irish woman of thirty-six, married, multiparous, came to the Women's Hospital for metrorrhagia and dysmenorrhea.

Physical examination showed nothing more than a slightly enlarged uterus, with several small myomata. The right ovary was enlarged and tender.

A supravaginal hysterectomy was performed by Dr. Bissell, from which the patient made an uninterrupted recovery.

Macroscopical Examination of the Specimen.—Uterus, with cervix missing, measures 8 × 6 × 5 cm. The serosa is smooth. There is a slight bulging in the right lower posterior corner, due to an intramural myoma, 1 cm. in diameter.

On opening the uterus a polypoid growth appears in the form of a globular tumor 1 1/2 cm. in diameter, beginning 2 cm. above the amputated cervix, the lower margin just above the internal os. This invades the uterine musculature for about 1 cm. with a fairly sharply defined margin. The surface of the growth is irregular and hemorrhagic. The upper border is less definite, but there is apparently some fundal mucosa uninvolved, the cervical mucosa below the tumor is thin and pale.

Tube and ovary received separately. Tube is 5 cm. long × 5 cm. in diameter. Its walls are thin, the course is tortuous, due to several slight adhesions. Fimbric extremity patent, fimbriæ normal.

The ovary is attached by normal mesovarium, it measures 3 × 2 × 1 cm. One pole is occupied by a greyish, yellow solid nodule 1 cm. in diameter, overlying a cystic corpus luteum 2 cm. in diameter.

Appendix 10 × 4 cm. Surface smooth, lumen patent, mucosa normal.

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* From the laboratory of the Woman's Hospital of the State of New York.

Microscopic Examination.—Sections taken at the fundus show the superficial epithelium to be somewhat irregular. The nuclei are of varying size and shape, and lie in irregular rows, so that the wall is more than one cell in depth. Between the irregular epithelial cells occur occasional very large cells with clear cytoplasm and a small central nucleus. The nuclei often stain strongly with eosin. The most marked deviation in type consists in a budding down from the surface of the epithelial cells to form a solid nest projecting into the stroma. Such nests are few, and they meet and merge with glands below the surface. Beneath the surface epithelium the fundal glands are undergoing irregular hyperplasia, with the same cell changes as noted on the surface. Also there occur buds of epithelial cells into the gland lumena similar to the one described, but here the buds are into the lumena, and not into the stroma as at the surface.

The proliferation of the fundal glands extends deeply, beyond the mucosa and into the myometrium.

The glands show little irregularity as compared to the common carcinoma adenomatosum of the fundus uteri, and the invasion of the myometrium gives superficially the picture of an adenomyoma. But the presence of the solid nests of cells in the gland lumena is very striking and unusual. The advancing line of carcinoma into the myometrium is met by no reaction on the part of the tissues. Against the normal muscle bundles lie glands of apparently normal outline and arrangement of the cells, which are in a single row, low and flat. On the side opposite the musculature the glandular epithelium shows unrest, being two and even three cells deep and irregular, while solid buds of the epithelium appear in the lumen. The advance is in a series of arches. Occasionally solid nests lie against the musculature without intervening glandular epithelium.

Sections at the fundus show a considerable area where the buds of cells have not developed. At this point there is little to suggest malignancy, and superficially the picture is that of an adenomyoma with no cytogenic stroma around the glands, which are penetrating the myometrium. But closer observation shows a slight optical unrest in the epithelium, the nuclei are irregular, and, in places, no basal membrane can be seen. With nothing to mark the transition, a nest of cells appears in the wall of a gland, and these nests soon become frequent; at the fundus also appear a few solid nests of cells, which show no connection with glands, lying in circular spaces in the myometrium. But the glandular origin cannot be doubted, as many connecting links are found in other instances. A section from the amputation of the cervix, and extending up to the carcinoma shows first a papillated surface with the superficial cells high columnar and actively secreting; the cells are in a single row, but, as the upper margin is approached, they heap up into two and three rows, very closely packed and in confusion, already suggesting carcinoma. The transition to the fundal type of surface cell is obscured by much optical unrest, the cells being many layers deep, and plainly carcinomatous. Here also are seen the remarkable nests of cells which are budding from the fundal glands. These cell masses so permeate the stroma that they give the appearance of being a part of the stroma. They are, however, epithelial in type, and they may be traced directly into the gland cells.

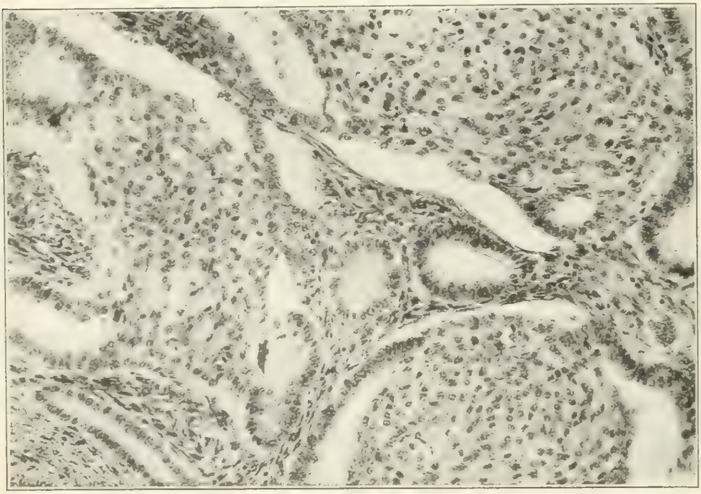

FIG. 1.—Section at fundus, showing origin of cell masses.

The cervical glands are somewhat dilated and tortuous, but they give no suggestion of malignancy. The importance of this section is in showing that the cervix is not the origin of the growth, and that the solid buds of cells are not metastases from a squamous celled cervical carcinoma.

Above the internal os the basal glands are not involved; they are of the interval type, are long and run parallel to the surface. The carcinoma spreads downward superficially over them, leaving them and the myometrium unaffected. The superficial papillated portion of the fundal mucosa shows many of the solid masses with necrotic centers, but there is no sign of cornification. The cells are large and vascular, and are of the squamous type. Phosomolybdic acid staining (Mallory) shows no fibrils uniting the cells. Fresh tissue examined in water and in glycerine shows, however, such cell connections. Mitoses are notably lacking. Keratohyalin and eleidin were not demonstrable by special stains—Pasini-Unna, Ficksche, Buzzi, etc.

The ovarial metastasis shows no normal ovarial tissue, only irregular strands of connective tissue separate the glands. The picture differs from that of the uterus by the absence of muscle-fibers between the glands. This gives the tumor a softer, more spongy appearance.

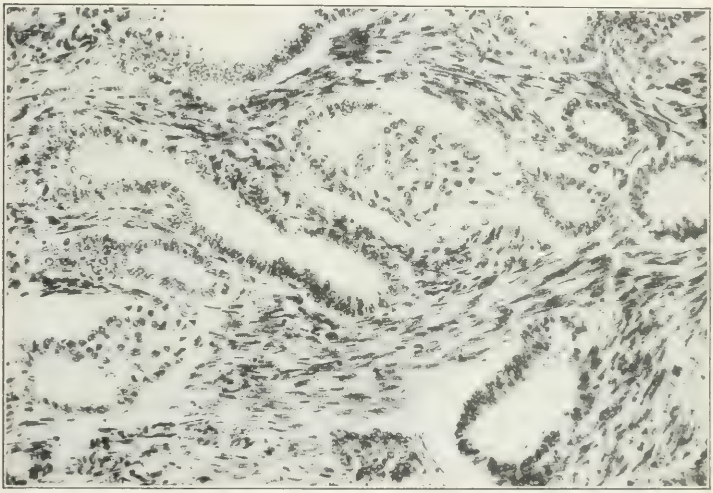

FIG. 2.—Ovarial metastasis.

This apparently has allowed the solid nests freer conditions for growth in consequence, and there is a diffuse spread of the solid carcinoma in addition to the glands and buds.

This case presents, then, a carcinoma limited to the fundus of the uterus, and apparently starting just at the transition from cervical to fundal mucosa. The cervix, which was not removed, showed at the operation no visible abnormality. This carcinoma of the fundus presents the unique feature of being an adenomatous growth of apparently regular form, its cells showing little departure from the normal glandular epithelium. But the glands show buds of cells with abrupt metaplasia into true squamous, or squamous appearing cells. The significance of these buds is open to several interpretations:

First, we must consider whether it is possible that this is an ovarial carcinoma metastasizing into the uterus. This actually occurs quite frequently. The secondary nodule may also be more extensive than the primary, and may take on an entirely different structure from the original, on account of altered environment (Pfannensteil). However, in this case the ovarial nodule is unlike any primary carcinoma of the ovary ever described, nor would this interpretation give any explanation of the squamous cells. In judging the character of epithelial cells we are thrown back on morphology alone, since the metaplastic cells by no means follow the tinctorial peculiarities of their analogues (Heitschmann and also Heurlin). Another possibility to be mentioned is this, that these nests of cells might be congenital residues, or else the result of regeneration from some pathological process. They are, however, plainly carcinomatous, which answers those queries.

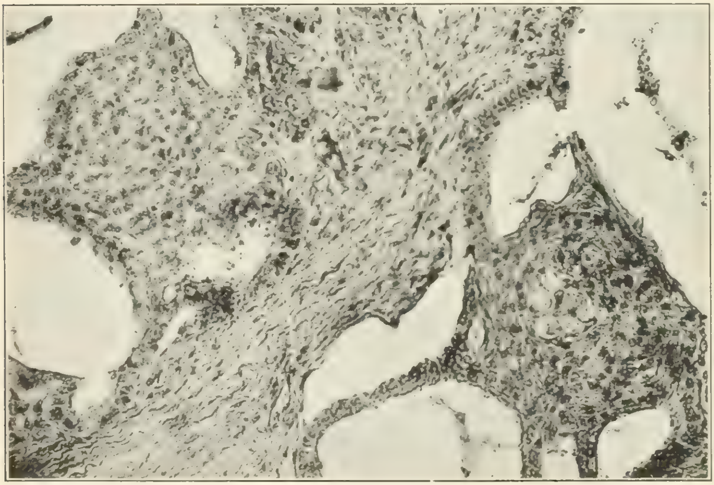

FIG. 3.—Typical section showing large cell-masses and normal-appearing glands.

Second, there may have been two separate carcinomata, one glandular and the other solid, and these may have grown together. Such an interpretation Aschoff gave for his case described in his Pathologische Anatomie, p. 610. Kaufmann, Hofmeier, Eckhardt and Emanuel have described similar cases.

In order to give proof of this it would be necessary to find the two primarily distinct In this case a portion of the fundus does indeed give the pure glandular type, but nowhere does the solid type occur alone. Theoretically we cannot deny that there may have been a microscopic squamous carcinoma of the cervix, though there was none detected at operation. However, that such a carcinoma could have produced macroscopic metastases in the fundus and in the ovary is out of the question. Moreover, the metastasis in the ovary speaks very strongly against cervical origin as by far the largest number of ovarial metastases are primarily in the fundus uteri, though fundal carcinoma is rare in comparison with cervical.

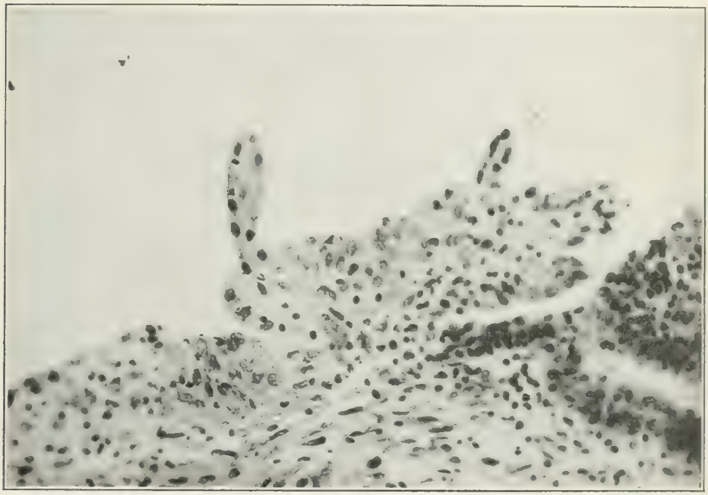

FIG. 4.—Usual type of squamous metaplasia seen in carcinoma uteri.

The metastasis further shows the unlikelihood of two separate origins of the primary tumor, in that both types are present in it. If there had originally been two separate carcinoma, a squamous in the cervix and a glandular in the fundus, the metastases in the ovary would almost certainly have been pure glandular. Possibly it might have been pure solid, but that it should combine both is not to be conceived.

For these reasons we may safely conclude that we are not dealing with a combination of tumors, and we must seek the explanation of the appearance in some form of metaplasia.

Metaplasia is most completely and satisfactorily described by Schridde in his monograph, *Die ortsfremde Epithelgewebe des Menschen,* 1907.

Schridde shows that the laws of ontogeny govern the development of the different types of epithelium. A direct transformation of a developed cell into a cell of another type is denied. From one primitive short cylindric cell arise all four types of adult epithelium. The type-characteristic of each form is dominant for its locality, while one other characteristic is latent in each form.

If, in the process of development the characteristic correlation becomes altered the latent becomes dominant, and a cell alien to the locality is produced. This is heteroplasia. Heteroplasia is common in the female genitalia, especially in the uterus. In the cervix one frequently finds islands of squamous epithelium occurring between the glands. Under normal conditions one never meets islands of squamous cells in the fundus uteri, though these are present in infants, and also in association with pathological processes. There is, in other words, never the production of a form which does not have its precursor in the adjacent neighborhood. The latent characteristic of the vagina is present in the cervix uteri, and vice versa.

A most significant conclusion is that in the permanent cells of human epithelium only two organ characteristics are present, one dominant, the other latent. This tendency to organ characteristics must be present in the germ cells, but its cause cannot be surmised.

Tumors, especially carcinomata, frequently have two characteristics. Schridde refers to a carcinoma corporis uteri showing a structure of cylindric and squamous (faserepithel) cells. He could directly demonstrate that in this rapidly growing neoplasm indifferent cells were present between the cylindrical cells.

Schridde finds that the laws of heteroplasia do not fit here. For these cases the explanation is that of indirect metaplasia. In indirect metaplasia there is first a reversion of the cells to a more primitive type. The daughter-cells of these reverted cells show metaplasia, that is, the normal dominant characteristic is suppressed and the latent characteristic becomes dominant.

In the uterus in gonorrhea and in pyometra one sometimes finds islands of squamous cells in the fundus. This is associated with healing, and is a regenerative process. It is present where pathological alteration is established, and where there are new-formative processes. It follows that metaplasia is not a congenital process, as is heteroplasia, nor is it located in predestined cells. The height of differentiation of an epithelium is the measure of its ability to undergo metaplasia. Only in low differentiation does it appear. The skin, for instance, shows no metaplasia, for its differentiation is the highest.

The endothelium and mesothelium are simpler, the uterus, for example, is slightly differentiated, and here we have the extreme metaplasia of the present case.

To explain the production of differentiated cells from less differentiated, as in indirect metaplasia, the laws of specificity of cells apply.

Normally the regional dominant of the mother cell goes to the daughter. But a depreciation of the local dominant may occur, that is a regression, and the local recessive character then becomes dominant. This is too long a step for highly differentiated tissues. The cause may be looked for in altered external life conditions, or other functional influences. Irritation may be directly shown in some instances. The metaplasia in this case differs fundamentally from the ordinary squamous metaplasia seen in carcinoma corporis uteri. In the usual form there is a gradual transition from the columnar to the squamous type, just as though it were a change due to drying, or other external influence. Thus it is similar to the indirect metaplasia of regeneration. The metasplasia is also secondary to the carcinoma formation, which is primarily glandular.

In the present case the transition from columnar to squamous is abrupt, without any intermediary forms, and it is evident that this group of squamous cells started from a mother-cell itself squamous.

Furthermore, the two forms of cell, glandular and squamous, are present equally in all parts of the tumor, even in the youngest spreading edge, and it is plain that there is not a secondary transformation into the squamous type starting from the columnar. The two forms represent two types fundamentally distinct from the very start.

Although we can form no conclusion as to the irritant or other impulse which set loose the carcinomatous growth, we may at any rate conclude this much as to its causation, namely, that it started from an embryonal cell, or from a cell that reverted to an embryonal type. This is a conclusion often averred for carcinoma, but it seems that, in this instance, we have conclusive proof of its actuality. This, then, is a process essentially different from metaplasia as portrayed by Schridde. Metaplasia in the ordinary form is the production of one type of cell in a locality foreign to it.

Here we have two types of cell, one indeed morphologically normal to its environment. Yet it was not from that cell that its companion sprang, but from the common ancestor of them both. If the squamous cell had sprung from the columnar it would indeed be metaplasia, but it is plain that it did not. As previously stated, the squamous cell was not formed secondarily, but both were present from the start. So, in some degree, the columnar cell is abnormal to its environment, and it plainly is in physiological sense, though morphologically normal.

The strict conformation to type present in this tumor is very striking and leaves no explanation possible, other than an embryonal origin.

A variant appeared among the gland cells, whether this was an embryonal cell left in process of development, or whether it was a revert appearing during the course of normal cell diversion cannot be decided. At all events this cell had within it two potentialities, the squamous and the columnar. It has transmitted these characters to its offspring, to one group the columnar, to the others the squamous. Since then the daughter cells have developed true to stain.

It would be interesting to speculate whether the Mendelian hypothesis might be further applied to these cells, and whether there is a fixed proportion of squamous cells and of columnar cells produced in the offspring. But this is not susceptible to proof.

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URINARY CATALASE IN HEALTH AND DISEASE.

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(With one illustration.)

ENZYME studies of the urine have been carried out for some time. Attempts have been made to identify the presence or absence or excess or decrease of a certain enzyme with a certain disease, but these endeavors have proved unsuccessful. Carcinoma has been thought especially to influence the output of the various enzymes. Scholz,(1) for example, reported an increased pepsin index in the urine of patients suffering with malignant neoplasm. But Takeda,(2) on the contrary, found that in diffuse carcinomatosis, pepsin is absent from the urine. Takeda's results were corroborated by Bieling,(3) who concluded that the presence or absence of pepsin in the urine is valueless for the diagnosis of cancer. Strauss,(4) who has investigated this matter quite broadly concluded that there are too many factors involved in the output of pepsin in the urine for it to have much specific diagnostic importance.

We have taken the excretion of pepsin in cancer as an example of the conflicting results obtained by the various workers in this field. The problem of the significance of digestive ferments in the urine is an old one. Thus physiology teaches that trypsin cannot reach the urine, because of the normal antitryptic quality of the blood, which may be regarded as indispensable for the preservation of the organism from the action of proteolytic enzymes, since these exert so marked an action on local structures. Greber attempted to sum up our knowledge on the subject of proteolytic enzymes. The enzymes in the zymogen stage may be absorbed into the blood and eliminated by the kidneys. Pepsin reaches the urine regularly, trypsin exceptionally. When the excretory duct of the pancreas is occluded trypsin begins to appear in the urine; also in diabetes and during the absorption of exudates and infiltrates. Pepsin, if normally present, disappears from the urine in severe disease of the stomach. Active trypsin, according to von Schönborn,(5) occurs very rarely and only in small amounts in normal dog's urine. Trypsinogen is more often present. Starvation induces the appearance of active trypsin in the urine; we also found that in quite a number of diseases in the human being trypsin appears in the urine. Bauer and Reich(6) reported that nephritic urine is rich in *anti*trypsin.

Diastatic ferments are also present in normal urines. Marine(7) found that the excretion of diastase in the urine is greatly lessened in nephritis and in diabetes mellitus, while it is increased in pancreatic disease. It is also markedly decreased in pernicious anemia and in secondary anemia. Marino believes that the quantitative estimation of diastase is a valuable functional test of the kidney. Corbett(8) using Wohlgemuth's method for the determination of amylolytic ferments, found that normal urine invariably contains these enzymes, while pancreatic disease gave rather high values.

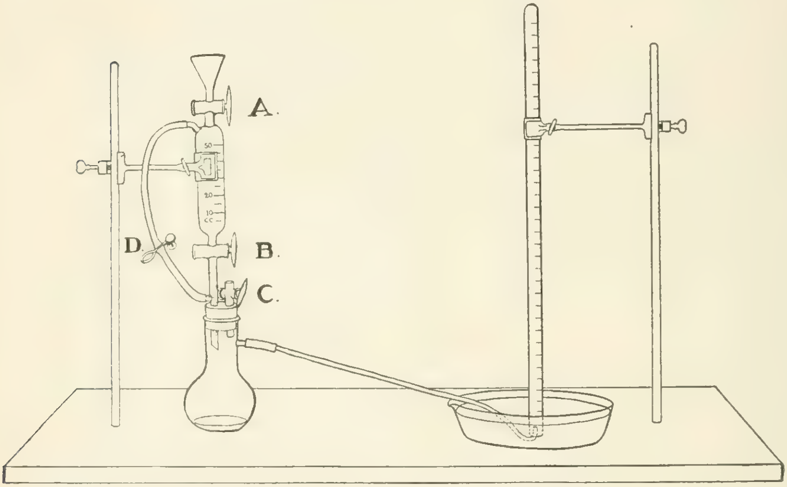

FIG. 1.

Catalase is an enzyme which decomposes hydrogen peroxide with the liberation of *molecular* oxygen. It is present in various animal tissues, such as the liver, blood, kidney, lung, muscle and brain. The thyroid, according to Juschtschenke,(9) has a rich catalase content—0.2 gram of tissue yielding 17.7 cc of Oxygen. According to this author, the catalase is present in the red blood cells, but is absent from colorless serum. Milk also contains catalase. Sarthou(10) states that these milk catalases are of two varieties: physiological and bacteriological, the latter of which is much more active than the former. Faitelowitz(11) confirmed partly these findings. Catalase increases with the age of the milk (Gerber and Ottiker(12), and is more abundant in pathological conditions of the milk than in normal milk. Leukocytes and colustrum increase the catalase content of milk. The acidity of the milk has no relation to the amount of oxygen liberated.(13)

Very young embryos contain catalase, and it does not seem to be less abundant in the embryo than in the adult.(14) The greatest amount of catalase is present in the liver, the least in the brain. Lockemann and Thies(15) have reported, however, that the catalase content of fetus' blood (rabbit) is generally less than that of the maternal blood.

In the alimentary tract catalase is present in varying amount in different portions of the canal, and in different species of animals. Dziergovskii(16) found this enzyme in great amount in the gastric mucosa of man, and smaller amounts in the intestinal mucosa. He also examined the intestinal canal of birds, mammals (rabbit, guinea-pig, dog) and fish. The alimentary tract of birds contains less catalase than that of mammals, while fish contain the least of all.

In pathological conditions, the catalase content of the tissues, blood, and urine is much changed. In inanition, it has been found by Dziergovskii in Russia, and Hawk in America,(17) the catalase content of the tissues is reduced to as much as one-half of the normal amount. It is also reduced in the blood in cases of anemia, nephritis, high temperature, and general metabolic disturbances.(18) It is decreased when the ureters are tied off, or when nephrectomy is performed. Winternitz and Melroy,(19) however, have found that in eclampsia the catalase content of the blood is *not* reduced. It is also not reduced, according to these authors, in cases of jaundice and diabetes mellitus. In congenital syphilis, anemia, and carbon monoxide poisoning the quantity is lessened. In pneumonia it is increased toward the beginning of the disease and diminished toward the end. In phosphorus poisoning, the liver loses catalase, whereas the other organs gain, according to Battelli and Stern.(21)

The catalase content of the various organs in cases of malignancy has been studied by a number of scientists. Blumenthal and Brahn (22) found that the liver catalase was lessened in carcinoma. They (23) also found that secondary cancer nodules in the liver show far less catalase activity than normal liver tissue; the liver tissue between the cancer nodules is less active than normal liver tissue, although more active than cancer tissue. Investigations of seven cases of carcinoma without metastases of the liver showed (Brahn 24) that cancer of the uterus (three cases) and esophagus (two cases) produces no reduction in hepatic catalase, but that cancer of the stomach (two cases) effects a marked reduction. Colwell (25) found that the catalase was below normal in the organs of persons with malignant tumors.

We have examined the urines of patients suffering from various diseases for catalase, in order to observe whether there was any constancy in the presence or absence of catalase as regards any specific disease. The method used was the following: (26)

TABLE I.—(NORMAL INDIVIDUALS.)

Name	Diagnosis	Volume of oxygen liberated in		
		1 min.	2 min.	5 min.
J. B.	Normal	0.7	1.0	1.2
J. B.	Normal	0.0	0.1	1.1
G. G.	Normal	0.4	0.5	0.8
M. L.	Normal	0.4	2.0	2.3
G. B.	Normal	0.7	1.4	3.0
J. B.	Normal	0.3	0.5	0.9
G. G.	Normal	0.2	0.4	0.8
H. L.	Normal	0.8	1.0	1.3
M. K.	Normal	0.2	1.1	2.8
J. G.	Normal	0.5	1.2	2.3
F. C.	Normal	0.0	0.8	1.8
G. D.	Normal	0.3	1.2	3.2
W. S.	Normal	0.1	0.7	1.2
S. B.	Normal	0.5	0.8	1.1
H. R.	Normal	0.7	0.9	1.3
D. F.	Normal	1.0	1.9	2.5
A. A.	Normal	0.0	0.8	2.9
D. L.	Normal	0.0	0.0	0.7

Fresh urine was invariably used in the experiment. Twenty-five cubic centimeters of urine were introduced into the flask. (See accompanying figure). Into the modified Johnson tube *ABD*, 50 c.c. hydrogen peroxide (Oakland dioxygen neutral to congo red) are placed. The eudiometer was new properly arranged, stopcocks *A* and *C* were then closed and stopcock *B* and pinchcock *D* opened

TABLE II.—(PATHOLOGICAL CASES.)

Name	Diagnosis	Volume of oxygen liberated in		
		1 min.	2 min.	5 min.
E. E.	Gastric cancer	0.0	0.6	2.1
E. E.	Gastric cancer	0.0	0.9	2.5
E. E.	Gastric cancer with acetone	6.7	17.7	42.4
R. R.	Gastric cancer	0.4	1.0	2.1
R. R.	Gastric cancer with bile	1.1	6.6	11.4
R. R.	Gastric cancer no bile	0.4	0.8	1.8
R. R.	Gastric cancer no bile	0.0	0.5	1.5
P. W.	Cancer of rectum	0.0	0.5	0.8
P. W.	Cancer of rectum	0.0	0.4	1.4
P. W.	Cancer of rectum	0.0	0.0	1.8
F. S.	Lymphosarcoma	0.6	2.8	6.7
F. S.	Lymphosarcoma	0.1	1.2	5.4
F. S.	Lymphosarcoma (blood)	1.8	9.0	22.8
D. B.	Hypernephroma (blood)	9.5	21.3	34.8
D. B.	Hypernephroma (no blood) album.	1.3	3.9	10.9
D. B.	Hypernephroma (no blood) album.	1.7	5.3	8.3
D. B.	Hypernephroma (no blood) album.	0.9	2.4	4.7
D. B.	Hypernephroma (no blood) no album	0.0	1.1	4.8
A. S.	Gastric ulcer	2.9	8.3	16.3
H. G.	Hodgkin's disease	2.9	7.7	14.4
H. G.	Hodgkin's disease with blood	6.0	16.1	41.0
W. P.	Cancer rectum with bile	1.0	4.3	10.1
W. P.	Cancer rectum no bile	0.0	0.0	2.8
E. E.	Gastric cancer	0.0	0.9	3.5
D. B.	Hypernephroma urine negative	0.0	0.8	2.5
A. S.	Cardionephritis	1.3	5.0	11.8
A. S.	Cardionephritis	1.1	10.0	28.7
I. D.	Cerebrospinal lues	0.3	2.3	8.0
R. S.	Tuberculosis of spleen	0.3	1.4	3.4
H. S.	Typhoid (trace acetone)	3.9	11.0	30.6
P. F.	Typhoid	1.6	4.8	9.2
H. S.	Typhoid (trace acetone)	2.7	6.5	15.5
M. M.	Typhoid relapse	1.4	7.5	15.4
W. S.	Typhoid twenty-eighth day	0.3	2.1	7.7
H. S.	Typhoid with acetone	4.2	11.6	25.4
M. M.	Typhoid with bile	3.3	13.2	25.2
F. M.	Typhoid	1.6	1.9	3.6
H. S.	Typhoid with acetone	10.9	21.2	25.2
E. E.	Typhoid	0.2	1.0	3.3
M. G.	Typhoid	0.3	1.8	4.0

TABLE II.—(*Continued.*)

Name	Diagnosis	Volume of oxygen liberated in		
		1 min.	2 min.	5 min.
J. P.	Typhoid with bile	7.9	16.1	23.3
W. S.	Typhoid	1.5	4.8	9.0
M. M.	Typhoid with bile	4.6	7.2	11.8
J. S. child	Typhoid	0.8	2.4	5.4
J. P.	Typhoid positive diaze	4.3	13.2	24.0
J. P.	Typhoid negative diaze	0.3	1.8	6.0
M. G.	Typhoid	0.4	0.8	2.5
S. K.	Typhoid with bile	19.6	31.5	43.8
G. F.	Meningitis	1.7	3.9	7.7
I. B.	Diabetes mellitus	0.0	0.4	0.4
J. G.	Diabetes mellitus	0.0	0.2	1.6
P. L.	Diabetes mellitus (acetone)	15.0	33.4	41.8
D. G.	Diabetes mellitus (acetone)	13.7	24.6	42.7
F. K.	Diabetes mellitus (no acetone)	0.0	0.7	3.4
M. P.	Chorea	2.9	3.2	5.5
A. B.	Lung abscess	1.8	2.3	4.7
A. B.	Lung abscess (urine bloody)	14.1	29.4	48.4
A. B.	Lung abscess	1.5	3.9	4.9
A. B.	Lung abscess (urine bile)	2.3	8.0	21.0
A. B.	Lung abscess (urine bile)	3.2	7.5	18.0
A. B.	Lung abscess	0.6	1.8	4.8
A. B.	Lung abscess (urine bile)	3.9	10.5	22.5
A. B.	Lung abscess	0.6	2.0	6.0
A. B.	Lung abscess	0.3	1.5	4.7
R. M.	Omental suppuration	1.5	2.6	5.6
R. M.	Omental suppuration	1.8	2.6	6.2
R. M.	Omental suppuration (urine with acetone)	2.9	8.4	29.7
R. M.	Omental suppuration (urine with acetone).	2.8	9.1	26.1
R. M.	Omental suppuration (urine with acetone)	2.0	8.6	20.7
R. M.	Omental suppuration (urine with acetone)	1.7	8.1	23.4
R. M.	Omental suppuration (urine with acetone)	1.8	5.8	32.4
R. M.	Omental suppuration (urine with acetone)	1.9	7.8	30.4
R. C.	Postoperative acetonuria	2.2	4.4	12.3
R. C.	No acetone	0.3	1.2	3.3
T. P.	Postoperative acetonuria	1.7	2.3	9.1
T. P.	Postoperative no acetone	0.8	2.2	7.1
T. P.	Postoperative faint guaiac	2.3	4.4	12.3
J. J.	Catarrhal jaundice	1.9	3.3	4.2
J. J.	Catarrhal jaundice	2.0	3.7	4.8

and 5 c.c. of the peroxide permitted to flow into the flask. The contents of the flask were now shaken briskly, care being taken that the intensity of the shaking process should be uniform from determination to determination. The volume of the evolved oxygen was determined at fifteen-second intervals through a two-minute period. The amount of oxygen was also determined after a period of five minutes.

The accompanying tables will show the amount of oxygen evolved by the urines of normal and pathological subjects. It will be seen from Table I that the highest amount of oxygen liberated by normal urine is 3.2 c.c. in five minutes. After one minute the highest amount of oxygen evolved by normal urine is 1 c.c., after two minutes 2 c.c. When we turn, however, to the urines of diseased subjects (Table II), we find that the catalase content of the urine is very much increased, depending upon the disease from which the patient is suffering.

From the figures of the foregoing tables we can draw the following conclusions: Traces of catalase were found in normal urine that had been freshly voided. In the urines of a number of patients suffering with various ailments, the catalase content varied. It was found especially high in urines that reacted positively for blood, bile, or acetone. Quite a number of urines of patients suffering from cancer were tested for catalase, and no variations from the normal were observed, except when bile, blood or acetone was present. Cases of lymphosarcoma and Hodgkin's disease gave very high catalase content in the urine. In severe diabetes, patients with acidosis eliminated very largely increased amounts of catalase in the urine; on the other hand, diabetics who had no acetonuria showed no variation from the normal in the amount of urinary catalase. Typhoid fever patients and others with general septic infections excreted increased amounts of catalase, more so if bile, acetone or blood was present.(27)

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A NEW VAGINAL WIRE SPECULUM.*

BY

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(With four illustrations.)

There always has been a demand for a practical vaginal wire speculum. That an endeavor to meet this demand had been made is shown by several varieties of specula on the market to-day. That these specula are not more generally used is undoubtedly due to the fact that they do not serve the purpose for which they were intended. A vaginal wire speculum finds its greatest usefulness in the examinations and treatment of inflammatory conditions of the vaginal mucosa, where a complete inspection of the entire vagina is desired. In ulcerations, in polypi and newgrowths of the vagina and in the observance of the condition of the rugæ a wire speculum becomes of infinite value. Usually in inflammatory conditions a considerable amount of pain is associated which invariably interferes with a satisfactory examination of the parts. To obviate this obstacle a speculum when introduced and adjusted should give no

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*Read before the Philadelphia Obstetrical Society, October 1, 1914.

discomfort, yet should expose satisfactorily the entire extent of the mucosa.

The above enumerated difficulties are entirely overcome by the speculum that I am describing. Furthermore, a full view of the cervix is brought into the field of vision with all its concomitant pathological states. Lacerations, erosions, ulcerations, polypi, new-growths and inflammatory states at once become apparent without undue distortion of the normal relationship of the parts.

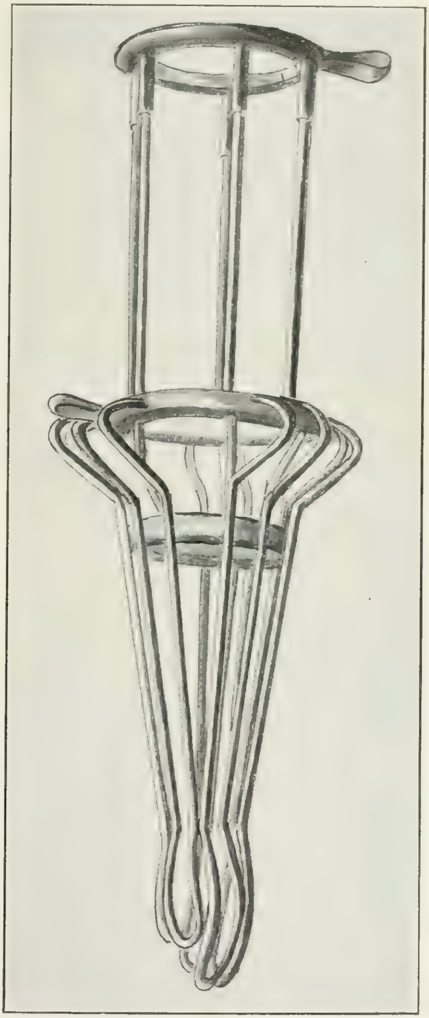

Fig. 1.—Side view of speculum, closed for introduction.

Description of Speculum.—The speculum may be described as being composed of two parts, but joined into one. The outer portion of the speculum when at rest is of cone shape. The cone is formed by five double wire prongs, held in position at their base by a ring to which they are all attached. The attachment to the ring is such that when the prongs are at rest the end of the speculum opposite the ring converges to a blunt point. The length of the cone is 5 inches and at the base measures 2 inches.

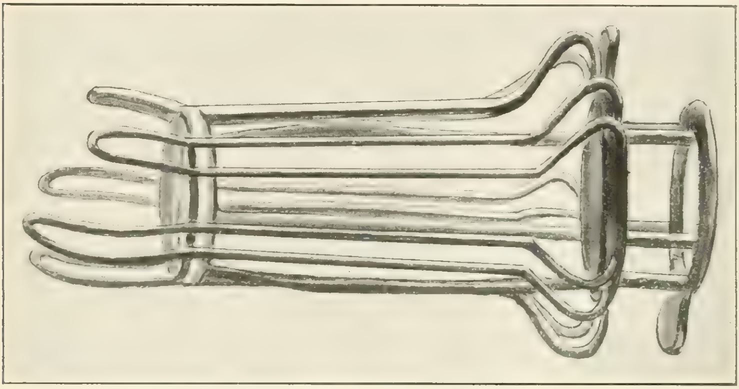

FIG. 2.—Side view of speculum open after introduction.

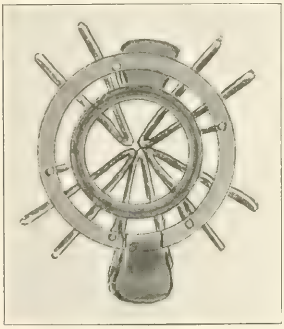

FIG. 3.—End view of speculum ready for introduction.

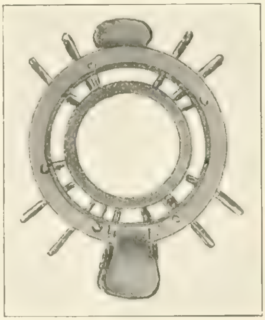

FIG. 4.—End view of speculum open after introduction.

The inner portion of the speculum whose function is to dilate the outer cone is of cylindric shape. The cylinder is composed of five thin rods and held together by two rings. It measures 4 inches in length and 1 1/2 inches in diameter. One end of this cylinder is held in position just inside the base of the above described cone. By gentle pressure this cylinder dilates the outer cone and converts it into a cylindric speculum. Two of the five prongs of the outer portion of the speculum are shorter than the remaining three, thus allowing the cervix to come into full view.

To recapitulate the advantages of this speculum:

1. It is simple in construction; is in one piece; no parts to get out of order; is inexpensive; is readily sterilized.

2. It can be used with the patient in the dorsal, lateral, or knee-chest positions.

3. Is readily introduced without pain and brings into full view the entire vaginal mucosa and cervix and facilitates local medication.

4. It should prove of value not alone to the specialist, but to the general practitioner as well as to the student.

5. It fulfills all the requirements of a practical vaginal wire speculum.

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SOME CLINICAL OBSERVATIONS IN EUROPE.

BY

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In these days of Teutonic disfavor it is a very special privilege to testify to the good qualities of our Prussian colleagues. It was my good fortune to spend several weeks prior to the war in the Franz clinic of Berlin. I selected this clinic because of the wealth of material and the conservative tendencies of the clinical staff.

Two features of the clinic were particularly noteworthy—the brilliant operating of Prof. Franz and the skillful cystoscopic work of Prof. Fromme. Incidentally be it said that both of these clinicians enjoy well-deserved popularity with the American colony. Prof. Franz is admittedly the most dexterous operator in the Frauenkliniks of Germany. His Wertheim operation for cancer of the cervix is completed in thirty-five to forty-five minutes and is more radical than the operation performed by Wertheim himself. While Wertheim excludes 50 per cent. of all cases, Franz operates 90 per cent. of all cases; and the percentage of cases living, after five years from date of operation, is not less than that of Wertheim.

Certain features in his technic contribute largely to Franz' brilliant results. He operates with spinal anesthesia. His incision is transverse and is of unusual width. His retractors permit of wide exposure of the field of operation. The illumination of the field, by artificial light, permits of no shadows. He is most ably assisted by his staff.

The obstetric side of the clinic bears the stamp of conservatism. It is the largest obstetric clinic in Germany. About 4000 cases a year are delivered in this clinic. Eclampsia is treated along the lines laid down by Stroganoff, *i.e.*, the administration of chloral and morphine at definite intervals and the letting of blood. All heavy operative procedures are proscribed. There is little else than low forceps permitted.

One patient delivered herself of a dead fetus after three days of coma and convulsions. Another was delivered on the fifth day of a dead baby by low forceps. Both were grave cases of eclampsia and yet at no time was operative intervention considered. It was admitted that such conservatism would not be adopted in private practice. In all 200 cases had, so far, been treated along these lines with the result that the maternal mortality had decreased from 12 per cent. to 9 per cent. and the fetal mortality increased from 17 per cent. to 47 per cent. Still they were not satisfied to pass final judgment on the method of treatment. Similar conservatism marked the treatment of eclampsia in the Glasgow maternity. In London there was a general tendency toward early operative interference in eclamptic cases.

In the management of placenta previa the Franz clinic lays down the inflexible rule to perform abdominal Cesarean section only in a central implantation of the placenta in a primipara. In all other conditions the hemorrhages are controlled and dilatation secured by means of a gauze pack or colpeurynter. It is an inflexible law that version, in a primipara, is never justified except in transverse presentations. Rather than perform version in a primipara, resort is had either to Cesarean section or craniotomy. Fear of rupture of the uterus is given as the reason for the dictum.

There was a young woman in Franz' clinic in the thirty-sixth week of gestation. She had a Cesarean section in her previous pregnancy two years before. The pelvis was moderately contracted, and there was slight bleeding from a marginal placenta previa. Prof. Franz advised against Cesarean section because of the questionable viability of the child, and directed that a hydrostatic bag be introduced and that the fetal head be perforated in delivery. The bag was introduced and pains became forceful within half an hour. A few minutes after the onset of pronounced uterine contractions the uterus ruptured through the scar of the former section and the fetus escaped into abdominal cavity. No time was lost in removing the escaped fetus and in performing a hysterectomy. The patient died in shock.

A critical examination of the uterus showed that the uterine musculature had never healed, that it was so separated as to form a wedge with the base at the uterine cavity and the apex at the peritoneum. Prof. Franz, commenting upon the case, said that henceforth he would make two radical changes in his conduct of cases requiring Cesarean section; first, he would make the incision in the fundus rather than in the lower uterine segment, and second, he would advise against allowing labor to proceed in any case in which there had been a previous Cesarean section. He was of the opinion that one hysterotomy called for another in a subsequent pregnancy, because it is never possible to judge of the character and resisting power of the scar.

At the Glasgow Maternity this point was further emphasized by Prof. Jardine and Dr. Samuel Cameron. Prof. Jardine performed a Cesarean section prior to the onset of labor, because the uterine scar of a previous section appeared to be extremely insecure. He laid down the dictum that rupture of the scar of a previous section is liable to occur as a result of the powers of labor, and therefore it would be safer to anticipate labor by a second section, and this to be followed by the sterilization of the patient. Dr. Samuel Cameron showed three specimens of uteri in which rupture had occurred through old scars of previous Cesarean sections. In all of them the musculature had failed to unite, leaving only a thin peritoneal scar to resist the intrauterine pressure of labor.

Pituglandol is preferred to pituritin in the Franz clinic and is given intravenously. With scarcely an exception the pains became strong within forty-five seconds following the injection. It was observed that less than 1 cm. was injected in some cases for fear of the depressing effects of the drug when given in the vein.

In the Rotunda Hospital of Dublin I was told that pituitrin had largely eliminated the forceps in the delivery of their cases.

A casual observer in the Franz clinic cannot but be impressed with the ultra conservative management of their cases. They were operating upon very few uterine fibroids. The only fibromata not treated with the *x*-rays were submucous, degenerated tumors and impacted growths causing pressure symptoms. What success they are having has not yet been determined. In the polyclinic I saw several cases which had received but temporary benefit from the *x*-rays. In these cases hemorrhage had stopped for a few months and had returned. Very few of the fibroids showed any considerable decrease in size as a result of the application of the *x*-rays.

Practically all the pelvic inflammations were treated by the Finson rays but the results were not clearly demonstrated for want of time. They believed, however, that they had gone far enough with their observations to warrant the assertion that the Finson rays are the most effective means available of relieving discomfort and favoring absorbtion of inflammatory exudates.

The Alexander-Adams operation is the operation of choice in retrodisplacements, though comparatively few cases are operated. Most of them are treated by massage, pressure therapy and the pessary.

One deplorable fact is mentioned because of the lesson it conveys. There is a large percentage of infection in the lying-in wards. This is due in part to the very old building, in part to the class of cases admitted, and to the interference of midwives in the home before sending the patient to the clinic. But the major part of the infections, I believe, can be charged to the practice of making repeated digital examinations by students as well as assistants.

The Glasgow Maternity presents unrivaled opportunities for the study of contracted pelves. There were sixty patients in the maternity and eighteen of them presented varying degrees of contracted pelves. Glasgow is cursed with rickets and, as a result, one will find a larger percentage of abnormal obstetric cases in the Glasgow Maternity than in any place in the world.

A visit with Professor Abderhalden in his physiological laboratory in the University of Halle was exceedingly delightful and profitable. I found him most genial and unassuming. He feels very kindly toward Americans because of the generous support they have given his work. Some surprise was expressed that the profession should find his test for pregnancy so complicated. "It is really very simple" said he. He is royally supported by all the clinicians in the University of Halle; but he has many antagonists throughout Germany. In his laboratory are a score of workers who have come from the various clinics of Europe to acquire the technic. They are finding the test reliable in 98 per cent. of cases. Professor Abderhalden spoke of numerous cases of interest. He referred to a calcified mummy *in utero* that was diagnosticated by Bumm as a fibroid tumor. A positive placental reaction was obtained in this case. Again he referred to a case of Doederlein in which a curettage had been performed for sterility. Ten days later a positive reaction for pregnancy was obtained, and later developments proved the existence of pregnancy.

In cancer cases Abderhalden is getting from 80 to 90 per cent. of reliable results. He says that his results would be still better if the clinical data, accompanying the specimens, were more accurate. Two cases were cited. The first was that of a tumor of the breast which was diagnosticated by the surgeon as cancer, but which did not respond to the clinical test for cancer. The clinical findings were clearly those of cancer so that the surgeon operated but found an abscess. The second case was in the surgical clinic of Halle under the clinical diagnosis of cancer of the liver. The diagnosis of cancer was confirmed by the laboratory test. Upon operation there was found an adherent gall-bladder full of stones. No evidence of malignancy could be found. A subsequent postmortem examination excluded all other evidence of cancer. A third case recited by Abderhalden was that of a woman operated upon for a tumor of the uterus. This tumor appeared twenty-seven years after the last pregnancy. A positive placental reaction was obtained and the tumor removed proved, on microscopic examination, to be a chorioepithelioma malignum. Abderhalden expressed the opinion that his work might prove to be of prophylactic value in these cases. Abderhalden claims 80 per cent. of efficiency in his tests for tuberculosis, and in syphilis, he affirms, the results are better than with the Wassermann test. In dementia precox he has had 100 per cent. of good results in a series of 2000 cases. In the kidney of pregnancy, and in cirrhosis of the liver, good results are obtained. The opinion was expressed by Abderhalden that his method would apply in theory to all infectious diseases, new formations and degenerations.

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GANGRENE OF THE LIMBS DURING THE PUERPERIUM.

BY

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The pathogenesis of gangrene comprises three types, according to whether the process is due to an occlusion of the arterial system, venous system or to both. The commonest type is arterial occlusion which results in dry gangrene, and this is the case when the arteries alone are the seat of morbid changes. In the venous types veins are the seat of a pathologic process, the arterial system being healthy, and lastly, we have the arteriovenous, or mixed type, when both venous and arterial systems are involved.

In the cases presenting the arteriovenous form, Wormser (*Wiener klinische Rundschau*, 1904) establishes quite a clear distinction between those in which occlusion of one vascular system only occurred after interruption of the circulation in the other system, and those cases in which the gangrene commenced only after complete obliteration in both vascular systems. He is of the opinion that when the gangrene follows a total occlusion of the popliteal artery, for example, and when after amputation or autopsy a clot is found in the veins, this gangrene should be looked upon as simply of arterial origin. On the contrary, if the embolus has not completely occluded the arterial lumen, and if a thrombophlebitis has taken place in the corresponding venous system, this forms the arteriovenous type.

In point of fact, if the gangrene, as in the preceding case, has commenced by an arteritis or embolism, the circulation will have been disturbed in totality only after the effect of the venous thrombosis has taken place. According to these three principal pathogenic modalities Wormser and the majority of writers sum up the causes of occlusion of the blood-vessels according to the table here given.

A. Occlusion of the Arterial System.

1. *Embolism* from endocarditis.
   Embolism from thrombus of the left heart.
   Embolism from paradoxal embolism.
2. *Primary arteritis* from septic or toxic endarteritis.
   Secondary arteritis by propagation of the inflammation of the neighboring veins.
3. *Primary thrombosis* coming from the uterine artery or its placental ramifications.
   Secondary thrombosis from total occlusion of the circulation in the venous system.

B. Occlusion of the Venous System.

1. *Primary phlebitis*: septic or toxic thrombophlebitis.
   Secondary phlebitis from a metrophlebitis, an extension of the inflammation of a neighboring artery or by contiguity.
2. *Primary thrombosis*, commencing in the veins.

Secondary thrombosis due to arrest of the circulation in the corresponding artery.

Arterial embolism, which is most commonly encountered postpartum, is due to a septic endocarditis with important valvular lesions. The valves may have been involved in a former articular rheumatism and are, therefore, all the more vulnerable. From these lesions of ulcerating endocarditis, only small bits become detached as a usual thing, and occlude a small vessel, such as the dorsalis pedis, perhaps also the tibial or popliteal, but massive embolism always arises from a thrombus of the left heart.

Let us for a moment consider the so-called paradoxal embolism which has been excellently treated by Guillaume in his thesis (Nancy, 1907). Starting from the placental insertion, the embolus reaches the right auricle and thence is carried into the left heart by way of a patent foramen ovale and *not* into the right ventricle and pulmonary artery. Now, although unfortunately no autopsy has proven this supposition, the theory is very plausible indeed.

The second cause of arterial occlusion is an arteritis, which may be either primary or secondary. When primary, the inflammation of the intima is always either septic or toxic in nature, either because the bacteria circulating in the blood become grafted, so to speak, on the walls of the vessel, or that the toxins of the bacteria are developed in the blood. Besides these cases, there are other instances of arteritis resulting from arterial lesions due to extension of the inflammatory process of the vein in the proximity of the artery. This is a secondary endarteritis and Lancereaux explains its mechanism as follows. The lesion starting from the uterine sinus extends to the renal veins by the uteroovarians. The extension to the arteries takes place by contiguity or by way of the capillaries.

The third and last type of arterial occlusion is a thrombosis of the uterine artery coming from the placental branches of this vessel. According to Wormser, this thrombosis may develop in the primary iliac artery up and into the aorta. It may likewise progress downward into the external iliac, the femoral artery and its branches. Thus, this thrombosis is primary and only becomes secondary when it results from a complete occlusion of the venous circulation.

In pure arterial occlusion, which gives rise to dry gangrene, the arteries of the limb involved are the only vessels the seat of morbid changes; the tissues die because they are deprived of blood. The process is no longer the same in gangrene resulting from venous lesions, because in this case the blood reaches the tissues but the return circulation is cut off. The occlusion is due to either phlebitis or thrombosis. The phlebitis may be primary in which case the lesion is a septic or toxic endophlebitis; this pathogenic modality is, consequently, analogous to a septic or toxic endarteritis. Virchow and Lancereaux admitted that the primary lesion is the result of a microbic infection having attacked the endovein. To produce gangrene, if the arteries are intact, the phlebitis must of necessity involve the large trunks and all the terminal branches. Secondary phlebitis originates in the placental circulation and uterine veins and from here reaches the femoral vein by way of the hypogastric. In this case, as in primary phlebitis, if the arteries are pathologically intact, all the collateral venous branches must of necessity be involved. There is one other rare type of secondary phlebitis produced by extension of the inflammation of an artery to the neighboring vein. All these types have been encountered in practice.

In the case of phlebitis, the interruption of the circulation in the venous system is produced by an inflammation of the endovein, but it may also arise from a thrombosis without any preceding inflammation of the endovein. This thrombosis may also be secondary to an arrest of the circulation in the corresponding artery.

Much discussion has arisen over the existence of a purely venous gangrene and from the puerperal viewpoint this question is a most important one. Phlebitis is a common complication postpartum and the return circulation being interrupted, gangrene should find a favorable condition for its development. The possibility of gangrene from venous occlusion, without participation of the arterial system, has been maintained by many able writers, others quite as competent have upheld a contrary opinion. For my own part I do not believe that a phlebitic thrombosis alone can by any possibility give rise to gangrene, for the very simple reason that a collateral circulation becomes too quickly formed for blood stasis to become absolute.

To conclude it may be said that arterial obliteration is the most frequent. The statistics of Wormse show that of forty cases, nine times the veins were the cause of the gangrene, the arteries eighteen times, while in thirteen cases an occlusion of both vascular systems was present. Of the eighteen cases having an arterial origin, the occlusion was due to embolism from ulcerating endocarditis in four. Three times from cardiac thrombus, ten times from endarteritis and once from paradoxical embolism. In the thirteen cases of the arteriovenous type, the obliteration was, usually in the beginning, arterial in origin. Of the nine cases in which the venous system was exclusively involved in only three could the cause be discovered and this was a thrombophlebitis. To Wormser's statistics I would add the more recent ones of Winterer (Thesis, Nancy, 1911) based on cases of which sufficient data could be had. Gangrene occurred forty-one times in the lower limb, sixteen on right, nine on the left, in thirteen it was bilateral, while the reports of the remaining three instances do not give the exact site. Eight times the upper limb was the seat of gangrene, four times on the right, once on the left and three times both upper limbs were involved. In four other cases both the upper and lower limbs were involved. From the pathogenic viewpoint Winterer remarks that there were thirty-two cases of gangrene of the arterial type, among which seven instances of endocarditis, two cases of paradoxical embolism, twelve of endarteritis and nine of thrombosis. The venous type comprised nine cases of gangrene, four of which were from phlebitis and five from thrombosis. And lastly he gives thirteen cases of mixed gangrene, in other words the arteriovenous type.

As can readily be assumed from what has been said, the chief cause of gangrene is infection and in probably all cases a puerperal endometritis opens the way. From here, either by the lymphatics or blood-vessels, the infection progresses, giving rise to a metrophlebitis, then to a phlebitis of the limbs. In other cases the infective agent enters the blood current directly, producing an endocarditis which may very well develop without apparent symptoms until the moment when an embolism suddenly draws the attention of the medical attendant to the heart. Or a primary thrombosis may occur, if the same bacteria by their toxins produce lesions of the internal lining of an artery or a vein. Usually, the sudden appearance of the symptoms are due to an embolism but Eichhorst points out that the endarteritis may also manifest itself in an acute outburst. On the other hand, the embolus may not completely obstruct the lumen of the vessel and it is only by the occurrence of a new coagulation that the circulation becomes entirely interrupted. Under these circumstances, the gangrene assumes the mixed variety, developing silently. The arterial types generally appear very shortly after labor, the principal subjective sign being the severe pain felt along the course of the artery. At this time one will note the absence of the pulse in the region subjacent to the point at which the clot has become lodged and this is soon followed by the loss of sensibility, although the motor functions may not be involved. The circulation becomes weak or disappears, the limb becomes cold and a livid hue of the skin is noted even before the disturbances of the sensibility.

By palpation of the painful region the artery will be found like a hard cord rolling under the examining finger. The temperature will be found raised 3 or 4/10° C. at the level of the point of occlusion and Broca supposes that this hyperthermy is due to a collateral circulation which has become more active. Taken together, these symptoms should indicate to the medical man that gangrene has commenced and if the circulation does not become reestablished by collateral means, the fingers, toes and finally the member takes on a blackish or dead leaf hue. The patient complains of tingling, a cold feeling, and cramps in the limb and after a time very sharp pain occurs, particularly during the night. Soon, at a spot, principally over the great toe, the skin becomes dull and streaked with bluish spots, while the integuments soon begin to dry. These latter symptoms are those more particularly observed in gangrene from endarteritis.

As soon as the gangrene is thus established, the paroxysms of pain become more and more unbearable and at this period of of the process, besides the lesions due to the primary causal infection, systemic absorption of the gangrenous products takes place. The pulse and temperature go up and the prognosis becomes bad because death will ensue before a line of demarcation has formed. On the contrary, if the line of demarcation forms, the greater its distinctness the more rapidly will these alarming phenomena amend, for the simple reason that the organism tends to struggle against the gangrenous infection.

At the commencement of the process, it is quite impossible to surmise whether the case is one of dry or moist gangrene, but in a general way it may be assumed that arterial obstruction will result in mummification, while moist gangrene is the outcome of venous occlusion. An embolus, which completely obstructs an artery, will not permit a single drop of blood to pass, but the lymphatics and capillaries remain patent and the fluids of the involved area are absorbed. By cardiac aspiration and by the evaporation taking place on the surface of the integuments, the skin becomes dry and parchment-like. In the case of venous occlusion there is always an arrival of blood to the parts, consequently the tissues will be edematous the return circulation being interrupted.

A gangrene of venous origin comes on later than that due to arterial obstruction. It is said that the former makes its appearance at about the sixth day but it may be more correctly stated by saying that this takes place more frequently during the second week post-partum but exceptionally it may be postponed as late as the ninth or tenth week. This lapse of time has been known to extend as late as the third or fourth month, but I am of the opinion that there is much room for doubt if really there is a direct relationship between the labor and the gangrene in such a case.

The commencement, usually insidious, makes itself known by some pain and a rise in temperature. This phase, which Vaquez designates by the name of preobliterating phlebitis, hardly ever extends over more than three or four days. After this time, the pain becomes more marked while tingling is complained of in the involved parts. Particularly marked in the calf and inguinal fold, the pain is spontaneous and is increased by movements. The knee-joint is sometimes the seat of an hydarthrosis. The venous occlusion produces a special form of edema. It commences at the tip of the limb and extends upward toward its root, but it may follow an inverse progress. White, because the integuments are bloodless, it is also smooth and hard. The subcutaneous veins are dilated, forming reddish arborizations under the skin. The walls of the capillaries, likewise dilated, may rupture and thus give rise to intradermic hemorrhage.

The occluded vein can be palpated and to the feel is like a hard, flexuous cord which can sometimes be felt as far down as the calf.

When the last ways of the return circulation have become obstructed, the fluids accumulate in the tissues which undergo a putrefactive process, exhaling a fetid odor. The skin, in which the veins appear like a red, blue or brown network, is pale or a dull gray and becomes covered with vesicles, then softens and it is at this point of the process that secondary infections come into play. Mortification takes place in irregular areas but it may very well involve the entire region. The inflammatory process extending to the arteries gives rise to secondary arteritides, while should this occur to the nerves, a neuritis is the result. In the arterial type of gangrene, I have said that death could take place before the formation of the eschar, but this fatal outcome is quite as much to be feared in the venous type of gangrene before the appearance of secondary infections, on account of the primary infection itself.

The diagnosis of postpartum gangrene does not usually offer any very great difficulty and in my remarks on the pathogenesis and symptomatology, I endeavored to establish clear distinctions between the various types of gangrene. The rapid appearance of the symptoms pleads in favor of an arterial process which, generally, will be of the dry variety. In the venous type, the edema is less hard and is accompanied by a supplementary subcutaneous venous network.

In gangrene of arterial origin, the absence of the pulse will be noted in the part subjacent to the point of obstruction, while in the venous type the arterial pulsation is preserved although the existing edema may make it difficult to detect.

Auscultation of the heart, at the time a puerperal infection arises, will reveal an existing endocarditis.

In symmetrical gangrene (Raynaud's disease) the arterial pulsations are also perceptible, the gangrene is distinctly limited in extent while the eschars develop in the areas exposed to pressure.

The various statistics that have been published relative to gangrene of the limbs postpartum present a serious prognosis, but at the present time there is an improvement. The prognosis naturally differs according to the type of gangrene. In the arterial type the possibility of successful amputation clearly contributes to a favorable outcome, while on the contrary, the mortality is very high in the venous types because treatment can only be directed toward the general condition of the patient. Lafond (Thesis, Bordeaux, 1901) records three deaths in three cases of venous gangrene, while of a total of nineteen cases of the arterial type, nine recovered. Wormser (*loc. cit*) gives twelve instances of arterial gangrene with six recoveries, while there were seven deaths out of a total of nine cases of the venous type. According to his statistics the prognosis is better in the arteriovenous form, because out of a total of thirteen cases, seven recovered.

As to the results obtained by amputation, Wormser was able to show that out of a total of fifty-four cases, twenty-four were submitted to amputation and six of these died, in other words a mortality of 25 per cent. The first fatal case was that of an amputation performed in the evening of the day that the gangrene appeared; in the second and third cases death resulted from the high position of the occlusion. In the fourth case the amputation was done in inflammed tissue. The fifth patient died after amputation from pneumonia, while the sixth died from endocarditis with occlusion of both iliac arteries, death occurring four days after amputation. The thirty remaining cases all died and among these were cases in which amputation could not be undertaken either because of the rapidity of the process or because the seat of the occlusion was situated too high up. Winterer's (*loc. cit.*) statistics concerning twenty-three amputations show that ten died, while of twenty-three cases in which no amputation was done, all died.

The treatment of gangrene of the limbs following labor will naturally vary according to the type of gangrene. According to statistics a judicious amputation will be successful in many cases of gangrene of the arterial type, but when the process is not limited any surgical interference is out of the question, antiseptic treatment of the parts involved being the only rational one. But as soon as a line of demarcation appears, no time should be lost in proceeding with amputation.

It is clear that one cannot always resort to surgical measures, either because of the bad general condition of the patient, or because of the extreme rapidity with which the lesions undergo their evolution, or on account of the seat of the occlusion being too high up. Surgical interference is to be avoided in cases of gangrene of the venous type and during the phase of phlebitis the patient should be kept quiet in bed and not allowed to move herself. The involved limb is done up in cotton which may be moistened with a solution of ammonium hydrochlor., and as soon as gangrene appears, the area must receive careful antiseptic treatment.

The general treatment consists in sustaining the strength, while the elevation of the temperature and pain must be dealt with along symptomatic lines.

3 RUE BELLOT.

INTROSPECTION IN GYNECOLOGY.

BY

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THE laws of compensation are no where more clearly demonstrated than in the success attending medical science to counteract the destructive forces acting on the physical nature of man. This is made necessary by the great exertions of civilized people in their efforts for commercial supremacy and for pleasure. As the forms of disease increase by virtue of our modes of life undergoing constant changes, just so the scientific mind has learned in many places to prevent and in others to diminish the death rate by prophylaxis and by a better knowledge of the causes of most of the diseases afflicting man to-day.

Our social excesses, cancer, venereal disease, mental strain, tuberculosis, food, etc., are certainly producing physical ills; thus a study of disease and social forces is demanded as never before. In this great struggle for conquest and pleasure, gonorrhea, meddlesome obstetrics, race suicide, and the curette are rapidly increasing the number of gynecological patients. Prevent these things and the number of operative cases would diminish to an astonishing degree. Too much praise cannot be given to the physician who gives some time to teach prophylaxis. His knowledge of social disease enables him to be a real teacher and his life becomes the nobler therefore.

I present herewith a study of my last 300 consecutive cases, ending July 1, 1914, which required abdominal section for pelvic disease in women. Since all the cases were pelvic and in women, this will be strictly a study in gynecology. Only cases are included where the principal or chief operation was pelvic, although several cases involved operation upon organs of the upper abdomen or the kidney at the time of the pelvic operation. I have included a few cases of appendicitis.

Are There Unnecessary Operations? Many of our great surgeons are rightly insisting that no one should do a major operation until the operator has been qualified to do such work. While this requirement is absolutely necessary, I often wonder if any of those highly qualified are at times performing unnecessary operations to produce statistics of many operations to say nothing of the fees received therefrom.

Allow me to quote from Long (AM. JOURN. OF OBST., July, 1914, p. 25): "One general practitioner in North Carolina did five Cesarean sections within six months." On page 26, "Harrar's cases point two morals: First, Cesarean section carries a danger to future pregnancy not dependent upon infection; second, in doing a second Cesarean the scar of the first should be removed." Long states that the responsibility for a rupture in a subsequent delivery should be shared by the man who did the previous Cesarean section.

If there is any one thing I intend to do, it is to combat the unnecessary Cesarean section. My revered teacher of obstetrics told us to always ask ourselves the question: "Would you wish the operation to be performed on your wife or mother in a similar condition?" In many of our hospitals to-day some operators have several Cesarean sections in bed at a time. Are they justifiable? There is a mortality, quite high with many. Since this operation is so easy to perform, is quite spectacular and generally commands respect from the laity and many general practitioners, the opportunity is very enticing. I used to say that it took a better man to tell when not to use forceps than how to use them. The same might be well said to-day of Cesarean sections.

I have recently been asked to deliver a woman who has had two sections by two different surgeons. She desires an opportunity to deliver this baby the natural way, claiming that both surgeons said her pelvis was not too small. The first section was for a rigid os (according to her statement) and the second one because the child was lying too much on the right side. In the second delivery she was not given the test of labor. I find that her pelvis is a trifle small, but am fearful of too much test on account of the two previous operations. I do not know whether she has two scars or only one. We frequently hear of women in labor being prepared by the surgeon for Cesarean, but who deliver themselves before reaching the operating room. It is impossible to improve upon nature in the majority of cases. Several times I have had cases sent me for Cesarean section, which I have been able to deliver the natural way. In the five years in which I had charge of the College Maternity Hospital and in the succeeding years in which I have done quite a little obstetrics in consultation, I have not had to do a single abdominal Cesarean operation. I have done several vaginal sections for eclampsia. I have not yet lost a mother. Many of my charitable friends call it luck. I prefer such luck to abdominal section for placenta previa, eclampsia, rigid os and malposition. A markedly contracted pelvis is a good reason for section, and I believe that three or four of my earlier cases of markedly contracted pelvis should have been subjected to a section.

I have the highest regard for those surgeons who are assisting the hopeful anxious mother to have a healthy baby. On the other hand I am not able to determine just how many little unborn lives are as valuable as a mother's. The mortality of the mothers thus operated upon is conservatively estimated to average 5 to 7 per cent. The unfair part of this risk is that the majority of those operated upon are generally poor and foreigners. If we are so honest in our contentions that the mothers should have healthy children, let us prevent the enormous amount of sterility due to gonorrhea and syphilis and do a little missionary work to lessen the awful amount of race suicide as practised by our better patients. We do not appear to be very ethical from the viewpoint of more healthy babies. The milk and ice associations are saving many fold more babies than the surgeons are bringing into the world by Cesarean section. And there are no tables of statistics read about this humble honest work. How consistent is man!

I do not expect many of my surgical friends to agree with me in such radical conservatism in regard to Cesarean operations, but I trust that my objections will prevent the pendulum from swinging too far on the surgical side. In further consideration of the question of too much surgery, let me add that a recent abstract on "Nephroptosis" states that the operator performed nephropexy upon 415 patients, and in 396 of these upon both kidneys. This is surprising in that no operation for ptosed kidney can be guaranteed successful in the majority of cases. The wonder is that so many patients could be found who might need and would submit to an operation on both kidneys.

Who Should Operate? Our modern hospitals, fully equipped with the latest appliances, trained operating room nurses, excellent internes, requiring strict asepsis in preparing the patient, instruments, gloves, clothing and the operator, have made it quite easy for any intelligent physician with a little nerve to attempt and perform the simpler abdominal operations as an appendectomy or removal of an ovary. If the untrained operator does not know what to do, the hospital assistant can do it for him. But unfortunately the appendectomy which appeared simple does not always prove so easy. Or it may be, as I have had the experience of correcting, he will include a piece of ileum in the abdominal wall when closing it. In many of these cases nature is very kind. Each year more and more of what were medical cases are properly being turned over to the surgeon. Dyspepsia and indigestion so often means appendicitis, gallstones,-infected gall bladder, pancreatitis, gastric or duodenal ulcer, adhesions or membranes about the cecum or colon, to say nothing of the thousands of cases of constipation due to chronic intestinal stasis—different degrees of ptoses. Lastly, we have the many cases in which indigestion means abdominal tuberculosis or beginning cancer. One often wonders what is left for the medical man outside of typhoid fever, which is also becoming a rare disease. Even vomiting in young children often proves to be pyloric stenosis.

When we consider the thousands of cases being operated upon in the great clinics, where the facilities for diagnosis and the operative technic are the best for the safety of the patient, the query arises as to what is to be the future of the plain every-day practitioner or little surgeon. Progressive medicine demands the best and the public well knows where it can be obtained. One thing is certain, there must be more "team work" in that physicians and surgeons must work more together and in harmony. We must use the many means at our command for a proper diagnosis before deciding that an operation is necessary, or on the other hand that a case continue as a medical one.

The time has arrived when every hospital must demand that a record book be kept in which every operator must enter the name of the patient upon which he intends to operate, a diagnosis must be made of the expected operative findings, the conditions found at operation, and finally the result of such operation. It might be well to add the names of those who assisted in making the diagnosis. Such a record is but fair to the patient. It will prevent the increasing tendency in the medical profession to commercialism. I have been keeping such record slips for some time, having the anesthetist enter expected findings before operation is begun, and what I have found at the conclusion. This procedure requires the surgeon to make as accurate a diagnosis as possible, especially as there are generally visitors who note the expected and real findings. It will be interesting to tabulate such records from time to time.

In 300 cases forming this study the operation was as follows:

TABLE A.

Principal operations		Other operations at same time	
Ovaries and tubes	168	Appendectomy	120
Appendectomy	21	Vaginal work	82
Hysterectomy	31	Adhesions	21
Extrauterine pregnancy	9	Gall-bladder	10
Adhesions	9	Ptosed kidney	3
Ligaments	15	Lipectomy	8
Myomectomy	7	Ligament	78
Twisted pedicle, ovarian cyst	3	Myomectomies	8
Other pelvic conditions	37	Pregnancy	3
	——	Meckel's diverticulum	2
	300	Carcinoma sigmoid	1
		Femoral hernia	1
		Inguinal hernia	2

It will be noted that there were only eighty-two cases in which it was thought that any vaginal work was necessary. There were three women pregnant at the time of operation. One, three months pregnant was bleeding continually; the uterus was well fixed in the pelvis by old adhesions; she gave birth to full-term twins. A second case, four months pregnant, had sufficiently severe tubo-ovarian trouble to demand operation, and a third at six months had a fibroid, subserous, size of a small orange, causing intense pain in the groin by pressure; the fibroid was removed. All these cases went to term, having living babies.

There were three cases of uterine fibroids where myomectomy was done as the chief operation. In one case where the patient had forbidden the removal of the uterus, small fibroids were removed. In two of these cases hysterotomy was performed for diagnosis and the removal of submucous fibroids. I fully agree with Dr. Deaver as to the value of this operation. In eight cases fibroids were removed, besides the chief operation. In the matter of a ligament operation, a modified Gilliam was the operation generally employed. In a few cases I used the Baldy-Webster method and in several the Coffey.

It was very seldom that a nullipara with unruptured hymen was subjected to a vaginal examination. A lipectomy by oval transverse incisions was done to remove the large roll of fat in eight cases, all of whom were being operated upon for some pelvic trouble. The healing was excellent in every case, practically no fat necrosis. We must avoid using many sutures in the fat itself. I have been surprised at the intense and early peritonitis and gangrene which occurs in and about a cyst with twisted pedicle. It is for this reason that all obstructions of such cysts and of the intestines should be operated upon very early. In the 300 cases there were six deaths, a mortality of 2 per cent. They were as follows: (1) Mrs. C., pyosalpingo-oophorectomy and hysterectomy for carcinoma; death on the fifth day. (2) Mrs. D., sarcoma of both ovaries, one tumor being the size of an eight months' pregnant uterus, died on the eighteenth day from metastasis. (3) Mrs. Z., hysterectomy; died on the sixth day from pulmonary embolism, she lived thirty minutes after the attack. (4) Mrs. B., carcinoma of the sigmoid; died from shock. (5) Mrs. H., simple oophorectomy; died on the tenth day from pulmonary embolism. Lived twenty minutes after the attack. (6) Mrs. L., Pyosalpingo-oophorectomy; died of ileus on the fifth day.

I could probably explain these cases to show that the operator was not at fault in any case. Both patients dying from embolism were in excellent condition until the time of the attack. The cases of carcinoma of the sigmoid and carcinoma of the uterus were given a chance. In the sarcoma case the patient had recovered from the operation and died from sarcoma of the brain. The death from ileus was probably due to disturbance of the nerve and blood supply of the intestine. These explanations of mortality are in accordance with the opinion of Dr. Norris, given below.

Mortality Statistics.—Referring to a low rate of mortality, a thing desired by all surgeons, Dr. Richard C. Norris says: "I do not think we can give a useful statistical report without a detailed description of every case that died. The student of the statistics can then draw his conclusions as to the cause of death, and not be compelled to accept the operator's opinion of the death."

There are three classes of surgeons who are assisting in keeping up a high mortality of certain diseases:

(1) The dollar surgeons; those who refuse to operate until their money is in sight.

(2) Mortality surgeons; those who refuse to operate on cases which might die. (I have had one series of 102 consecutive unselected abdominal operations without a death; these statistics may mean much or little.)

(3) Incapable surgeons; those who will operate on any case at any opportunity for price or experience.

Does any man dare say that in cases of cancer of the rectum, stomach, etc., that the patient should not, unless inoperable, be given a chance? We should think more of those we might save than of a report with lowest possible mortality which has been gotten at the expense of a number of lives, at least a few of whom had a good chance to live.

A very interesting study could be made of those cases which are treated both by medical and surgical men, *e.g.*, appendicitis, diseases of the kidney, ulcer of stomach and duodenum, gall-bladder, etc. Even the treatment of pyloric stenosis in the infant is followed by a lower mortality by surgical than by medical means, provided, of course, that there has been a condition of true stenosis. I mention this comparison of mortality as a result of medical or surgical treatment for one reason, viz., we are demanding a higher requirement of surgical ability, but we still allow anyone to prescribe for every serious ailment. We cannot prevent those who practice any "ism" from using their form of treatment on diseases of the heart, lungs, kidneys, etc. They are not compelled to account to any intelligent body or to the public for a high percentage of deaths.

Since the public mind is being influenced through the press and popular magazines by such writers as Ella Wheeler Wilcox, who declare that many surgical operations are not necessary and that our great surgeons who have practised on dogs are extremely cruel, we must rejoice that only a few of our writers have become hysterical. Their peculiar sentimentalism is the result of ignorance of anatomy, anesthesia, pathology, surgical methods and the spirit of the good samaritan. It is a pleasure for these reasons to read the following from a recent book by F. Marion Crawford: "Surgery is a fine art that has reached a high state of development in the treatment of facts about which good surgeons are generally right. A great deal of noise, is made over surgeon's mistakes, which are advertised by their detractors, but we hear little of their steady and almost constant success. Medicine, on the other hand, must very often proceed by guess work;

but for that reason it covers up its defects more anxiously and is more inclined to talk loudly of its victories."

How Long Shall We Delay Operations in Cases Where There is an Elevation of Temperature? In the AMERICAN JOURNAL OF OBSTETRICS, vol., liii, No. 1, in discussing "Temperature in the Puerperium," I stated, "The old teaching that a temperture persisting above 100.4° F. for twenty-four hours should be considered septic, has resulted in many a physician thinking that through some unknown way the patient has been infected, and immediately seeking to remedy the difficulty, has used the vaginal and intrauterine douches and that deadly weapon the curette. "This was eight years ago; the last five years has witnessed the truth of this statement. The teaching of all good men to-day is to keep out of the uterus in these cases of suspected infection. For several years I have cautioned against the routine use of the curette in pelvic surgery. Many a surgeon cannot remove an ovary or repair a perineum unless he scrapes away the endometrium as much as possible. It is a very dangerous thing when the gonococci are lying dormant in the endometrium. Very many cases of pus tubes are caused by this procedure. The curette is a necessary and useful instrument when properly used at the right time.

It may seem somewhat inconsistent in view of the above remarks for me to say that I am firmly convinced that many of our very able surgeons are delaying too long the operation on the tubes and other pelvic structures when they keep them in bed or at rest from two to six months after the temperture has become normal.

A few years ago we were afraid to close an abdomen without using vaginal or abdominal drainage, often both. To-day drainage is only used in acute suppurative cases or if by chance there is vascular oozing which cannot be controlled by ligature. We know that old sterile pus can be spilled in the abdomen and do no harm. Just as we had to learn the physiology of temperature in the puerperium, so must we study and understand the power of the body to acquire resistance by the presence of its own pus. This same pus placed in a clean abdomen would produce disastrous results. It is clearly exemplified in the use of vaccines. Too much rest, too long waiting unnecessarily, produces a neurosis worse very frequently than the disease. I determine to my satisfaction by the temperature, repeated leukocyte counts, etc., when the patient is in condition for an operation. If pus can be evacuated per vaginal incision into the cul-de-sac or extraperitoneally above Poupart's ligament, it is done as soon as possible.

I present for your consideration cases which occurred as a part of the 300 patients studied. There was no mortality in this class, which embraced all those which had any appreciable elevation of temperature before operation. I have been able to remove the appendix in every case of acute suppurative appendicitis, regardless of age or sex, during the last two years. The result is much better than when we drained and did a second operation. Why then keep your patients in bed for several months after temperature has been normal?

PATIENTS HAVING A MARKED ELEVATION OF TEMPERATURE BEFORE OPERATION.

Name	Admitted	Day of oper.	High leukocyte	Low leukocyte	Days before oper.	High temp. before oper.	8 P. M. day of oper.	High 2d day after oper.
1. Mrs. H.	2/3	2/18	18,600	13,200	2	100.0	97.4	99.0
2. Miss K.	1/4	1/23	14,500	8,500	1	101.2 99.0 (121)	99.4	99.4
3. Miss S.	4/26	5/2	20,600	11,000	2	102.4	99.0	100.0
4. Mrs. S.	5/15	6/3	18,000	11,600	4	102.4	99.0	100.4
5. Mrs. N.	2/10	2/14	24,600	18,000 (2/15)		103.0 100.2 (2/13)	98.6 100.0	99.6 99.6
6. Mrs. H.	7/9	7/26	14,100	9,600	2	100.6	99.8	99.6
7. Miss H.	8/11	8/18	16,000	8,800	5	100.0		
8. Mrs. S.	8/10	8/10	8,300 (8/31)			102.6 (12 M.)	100.0	100.4
9. Mrs. E.	2/3	2/4	7,600			100.0	101.2	99.8
10. Mrs. S.	9/20	9/28	18,300	9,200	1	101.4	98.4	99.8
11. Mrs. T.	11/17	11/24	22,000	14,600	4	102.2 99.2 (11/23)	98.6	99.6
12. Mrs. S.	6/19	6/20	10,500			100.4	100.2	100.8
13. Mrs. C.	5/4	5/11	15,000	12,000	3	100.6	100.0	99.4
14. Mrs. H.	8/9	8/9	10,500			103.0 101.0 (8/9–9 A. M.)	101.5	100.2
15. Mrs. W.	3/5	3/12	17,200	9,000	1	102.6	99.8	99.4

In most of these cases the temperature was higher at home before admission into hospital.

Operations on the above were as follows:

No. 1. Mrs. H. Double pyosalpinx; removal of one ovary; resection of the other; appendectomy.

No. 2. Miss K. Single pyosalpingo-oophorectomy; appendectomy; ligaments.

No. 3. Miss S. Double pyosalpingo-oophorectomy; appendectomy.

No. 4. Mrs. S. Omentum, sigmoid, left ovary and pus tube in one mass; removal ovary and tube; appendectomy; trachelorrhaphy.

No. 5. Mrs. N. Supravaginal hysterectomy; double pyosalpinx; fibroid in broad ligament.

No. 6. Miss H. Abscess left ovary and tube; appendectomy.

No. 7. Miss K. Pyosalpinx.

No. 8. Mrs. S., sent to hospital, hastily, from Clarion County, August 10, 1913. On admission temperature 102.6°, pulse 120, respiration 28. Fecal vomiting, mass in right side of pelvis, easily felt externally. Diagnosis of intestinal obstruction had been made. Operation 3:30 P. M. Found large mass consisted of uterus, with fibroid, broad ligament inflammatory, ovary tube and small intestine. Broke up some of the fresh adhesions. Old adhesions of intestines to mass too solid to break up. Decided to close without further disturbance. Drain. Examined culdesac per vagina. No free pus. Did not incise. Put dressing forcep into uterus, spread blades to open canal for drainage, some pus in canal, closed and withdrew round worm, 3 inches long, living and well, from uterine cavity. Literature consulted fails to record a similar case. I am convinced worm went from intestine, into tube and uterus. Patient left hospital on twenty-fourth day in excellent condition. Report May, 1914. Feels good, gained 13 pounds. Some pelvic pressure, bowels fair. She probably still has the fibroid.

No. 9. Mrs. E. Very dense adhesions of intestines, omentum and pelvic organs due to tuberculosis. Unwise to separate any of the structures. Abdomen closed. Patient treated. To-day, sixteen months after operation, patient feels fine. Mass absorbed. Pelvic organs freely movable.

No. 10. Mrs. S. Pyosalpingo-oophorectomy; appendectomy. Pus tube had extended through peritoneum, behind cecum.

No. 11. Mrs. T. Salpingectomy; appendectomy; dense adhesions; appendix ruptured at base.

No. 12. Mrs. S. Ruptured tubal pregnancy.

No. 13. Mrs. C. Aged forty-two. Taken ill suddenly May 3, 1914. Pain in right pelvis and about appendix. Feeling faintness. Walking in park when pain began. Went home on street car. Vomited several times after reaching home. Sent for physician who diagnosed it as appendicitis and gave her hypodermic morphine. Sent to hospital next morning. I saw her and agreed with the diagnosis; pain in same region. Did not make pelvic examination. Leukocyte count, 15,000. Temperature 100.6°. Pulse 96. Patient improved and at operation, May 10, found acute appendicitis; but cause of pain and illness was a large corpus luteum cyst, twisted on its very thin pedicle, also half turned upon the body; the larger end being in culdesac. Cyst 2 in. by 6 in. quite black. No drains.

Patient made an excellent recovery; left hospital seventeen days after operation. I do not know why an internal pelvic examination was not made, unless it was fate. Examination would have revealed the cyst, which would have been diagnosed by most surgeons as an old, large pyosalpinx, justified by her history of previous right side pelvic pain. Had such a diagnosis been made, operation would have been delayed with a possible fatal result.

No. 14. Mrs. H., taken sick suddenly, August 7, 1913. Pain right pelvis; vomiting; temperature 103°, pulse 120 at end of thirty hours. At end of thirty-six hours a mass size of orange apparently attached to right side of fundus. Entered hospital at end of fifty-four hours. Tumor increasing rapidly, pulse 102, temperature 101°. Leukocyte count 12,000. Diagnosis, ovarian cyst, twisted pedicle. Operation at fifty-six hours. Large ovarian cyst, twisted pedicle, several turns, growing from left ovary, lying over uterus on right side. Cyst gangrenous. Much peritonitis. No drain. Excellent recovery. Discharged sixteenth day.

All the above patients are entirely well to-day. In none of these cases were there any untoward symptoms due to not waiting several weeks. In some cases they might not have survived a postponed operation, particularly Nos. 5, 10 and 11. In only one, No. 8, was drainage used.

What is the Result of our Operations? I am reminded of the story told by one of our leading surgeons who had made a careful study of the wards of one of the great European surgeons. He said that when he asked one of the patients of this great surgeon how she was feeling after her extensive operation, she replied, "Oh, pretty well." "Have you any pain now?" "Yes, I have; about the same as before." "Why do you not tell your doctor? He thinks you feel fine." "Oh, he is such a nice man, I do not like to have him think that my operation was not a great success." Surgery helps many by removing diseased parts and by repairing others; the kind, suggestive words of the surgeons and nurses help others; a few are no better or actually made worse. We all at times have seen where we could have done better had we known; still we did the best we knew how. The percentage of deaths from all operations is becoming less each year. We are relieving pain by small doses of morphine (occasionally "a hypo of salt water"), enemas, and local anesthesia in the tissues incised; there is less vomiting by a better preparation of the patient, better and less anesthesia and by gastric lavage; there is less ileus and gas trouble since there is less handling of intestines, not so many hot packs into the abdomen, good enemas and a hypo of pituitrin when necessary; there is less sepsis, a thing practically never seen as the result of a clean operation; there are less adhesions since we have ceased to use the drainage tubes; ventral hernia at site of incision is very rare; and finally a more rapid and more certain recovery, since there has been better preparation and an earlier order for the patient to have fresh air, light and water.

In conclusion, allow me to say that I long ago felt that it was impossible for a man to be a real obstetrician, unless he had the operative ability of a gynecologist. To-day, since we have learned that many a case is sent to the gynecologist because she has a fibroid or a small ovarian cyst, when she should have been sent to the abdominal surgeon, I believe that all gynecologists should be prepared and do whatever surgery of the abdominal cavity may be necessary.

Since there is so much dissatisfaction in cities when the general hospitals receive a large part of their income from the state, as to what rights the average physician has in such hospitals, the question arises whether or not we should have but two definite classes of hospitals. First, those owned and conducted by any reputable physician, church, or body of persons whose staff could consist of whomsoever they might choose to have, such an institution not to receive any state or city aid. Second, the charity hospitals sustained by the city and state, as well as by aid from any church or charitable institution which might choose to contribute to their welfare. The staff of such hospitals to be chosen by competitve examinations as are the army and navy surgeons. Having these two classes of hospitals would prevent many of our hospitals' wrongs. The private institutions could treat as many charity cases as they might care to provide for, and the charity hospitals could have private wards and rooms as are provided in hospitals for infectious diseases. Many a poor surgeon would not be able to hold a staff position under such an arrangement, nor would many of our patients with a good income and property wish to go to a charity hospital. To-day they are admitted free and the surgeon on service often collects a good fee.

When we pause to consider the large number of institutions now in existence which claim to cure the sick by the use of natural methods, *e.g.*, rest cure, electricity, baths, water-cure, sunshine, walks in the early morning dew, diet of whole-wheat bread, pressed raw food, nuts, in fact, any diet which is novel and inexpensive to the institution, cures by faith and prayer, and a multitude of others which do not occur to the mind. Then, when we further learn that many good people, persons of sound reasoning, credited as being of a high grade of intelligence, except by certain physicians, proclaim that they have been highly benefited and cured by some of these various methods above mentioned, it is time for us to pause and consider what is the trouble with our treatment in so many cases.

The above article is not the product of the mind of a cynic or an inconoclast, but one who has tried in a feeble way to discover the philosophy of the treatment of disease. As the medical profession contains quite a large number of honest, although derided materialists, who would teach our jurists that many transgressions of the law are due to definite pathological conditions in the convicted party, in the same spirit of justice we must grant the intelligent public the privilege of deciding for their own satisfaction whether or not the medical profession is at times a little dogmatic, at least as to whether the individual may choose to eat, sleep or have part of his anatomy removed.

The woman (Mrs. F.) who consulted me some time ago, desiring the privilege of a good test of labor, to which reference was made in a preceding page, entered the hospital, August 12, having been in labor for ten hours before admission. Three very careful examinations were made in the next eight hours. I became convinced that as the head had not become engaged at the superior strait and as she had had two Cesarean sections, it would be dangerous for further attempt at a natural delivery, and instrumental delivery was out of the question in this case.

Accordingly, at 4 P. M. of the same day, I did a third section and delivered the woman of an eight and a half pound girl. The mother made an excellent recovery and she and the baby left the hospital, both well, on the nineteenth day.

I feel that inasmuch as the pelvic measurements were sufficiently below normal to make a natural delivery dangerous for the mother and probably impossible for a living child to be born, that abdominal section was the proper procedure in all three deliveries. Still I am more than ever impressed with the fact many men unnecessarily perform this operation. The operation is so easily performed and the applause of the gallery is so great that the temptation is easily understood whereby the obstetrician will place more dependence in his ability to measure a pelvis than he will in his own calm deliberation and reasoning.

In conclusion I would say that abdominal section for delivery of a child is occasionally necessary, but not nearly so often as is practised by many men.

JENKINS ARCADE.

IODINE AS A STERILIZING AGENT IN SUPRAVAGINAL HYSTERECTOMY—WITH REMARKS UPON MORBIDITY.*

BY

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THE low rate of mortality following hysterectomy appears to have satisfied the surgical mind, if we may rely upon the output of literature upon this subject. Since the comparatively low rate of 5 per cent. has been attained by many operators, and a still lower rate by a few, we note the rarity of remarks upon the morbidity which must still exist and which should be minimized if not eradicated.

It is unnecessary to repeat or to discuss the findings of those claiming the absence of infective bacteria in the uterine canal. Everybody knows that the vagina contains many varieties, and some say that these are good enough to penetrate only a short distance into the cervical canal. However this may be, all of the hysterectomists fear infection about the stump, under the bladder, reflexure, or between peritoneal folds, as after the removal of an intraligamentary growth.†

Our efficient secretary, Dr. Broun, has discussed this subject in AM. JOUR. OBST., N. Y., 1901, xliv, p. 792, and his paper appears to be the last word we have been able to find. In this paper Dr. Broun has mentioned the practice in vogue at that time, namely the drainage of the cervical canal or the space above the cervix through the canal. In common with many, the writer also drained many of his cases, and with the result that an improvement was shown in diminished morbidity. Every variety of method, such as gauze or tube drainage, and the removal of the cervix was practised by many to promote drainage. The writer has always found good results follow these methods. There is a very small mortality after total hysterectomy for fibromyomata, and the institution of some kind of drainage is desirable in the absence of a definitely sterile field through which to make the amputation of the uterus.

With the nearly perfect results of skin sterilization we shall not

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* Read before the American Gynecological Society in Boston, May 23, 1914.

† The deaths from embolism which the writer has reported elsewhere occurred in patients with infection under the flap.

deal at present, but the application of iodine alcohol to the vaginal and uterine mucosa has been productive of results which appear to approach the ideal. The patient is brought to the operating table after the proper examination has been made which shows her condition to be satisfactory for operation. She is placed in the lithotomy position and a 25 per cent. diluted alcoholic tincture of iodine is applied over the genitals and introitus vaginæ. The catheter is used immediately after this, and a perineal retractor introduced into the vagina and a volsellum used with which to grasp the cervix. The cervix is dilated to admit the conical nozzle of a two-ounce glass syringe. An ounce of the same 25 per cent. iodine alcohol solution is then slowly injected into the cavity of the uterus. The fluid is not allowed to remain as long, nor is great force used, as we have advised elsewhere.* After the injection the cervical canal should be again gently dilated to make sure of the discharge of the excess of the solution. Every part of the vagina is exposed and treated with the solution by the assistant who makes this feature of the technic an important one. The operation is preceded by a second application of iodine to the skin over the abdomen, the first having been made before the anesthetic was given. After this the operation proceeds as usual and a final application of the iodine alcohol is made to the stump before closing the flaps if there is the slightest intimation that infectious matter has been handled, such as in an apppendix, pus tube, etc. Finally, the iodine solution is applied over the closed abdominal incision before the usual gauze dressings are applied.

The result of this technic has been quite satisfactory thus far. Certain precautions should be taken, however, which we have learned to practise as a result of some years of experience. It is very important to remember that iodine is a toxic agent, and we are not willing to advise undue or unnecessary use of the drug. In our 1912 paper we fully described the method we used for injecting the Fallopian tubes, and we advised the use of a considerable degree of force in the accomplishment of such a result. But our experience since then has shown the desirability of avoiding great force which in one of our cases caused either toxic symptoms or those of shock, and which alarmed our anesthetist for a time. Beyond doubt iodine is a toxic agent and it is quickly absorbed from mucous surfaces for it is almost impossible to get an iodine reaction, after opening and exposing the mucosa of the attached uterus.

STONELEIGH COURT.

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*See Va. Med. Semi. Monthly, Richmond, Va., 1912–13, xvii, 105; and J. A. M. A., 1913, lx, 656, a paper prepared for the Association meeting for 1912.

TRANSACTIONS OF THE AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS.

OBSERVATIONS OF TORSION OF OVARIAN CYSTS WITH REPORT OF CASES.[1]

BY

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An ovarian cyst has all the mechanical conditions favoring torsion. It is freely movable and is attached to a more or less fixed base by a pedicle. The exciting causes of torsion are intra- or extraabdominal, some of which act suddenly, others gradually.

The sudden factors may be based either on strained muscular actions such as lifting, stooping, movements in bed, getting out of bed, etc., or on rapid changes in the volume of surrounding organs, such as the evacuation or distention of bowels and bladder, expulsion of child from a pregnant uterus, etc.

The gradual factors are difficult to define in individual cases, but can be readily understood in a general way. The unequal growth of the different loculi in a multilocular tumor and the tendency of the largest one to occupy the concave anterior abdominal wall; the gradual rise of the growing cyst from the small pelvis and its unavoidable, inevitable tendency to fall forward; the gradual increase in size of neighboring organs, such as the pregnant uterus and growing pelvic tumors—all these factors act on the cyst gradually and sometimes imperceptibly until a torsion of sufficient degree is induced to bring about disturbing symptoms.

Torsions, whether sudden or gradual are at least of 180°. A twist of less than that does not interfere with the circulation of the pedicle and therefore does not cause any disturbances. It should be remembered, however, that a turn below 180° may, by the increase of venous pressure in the pedicle, favor a gradual development of torsion. This point has been proven by Edwin Payr(1) who experimentally induced torsion in different organs by in-

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[1] Read at the Annual Meeting of the American Association of Obstetricians and Gynecologists, Buffalo, September, 1914.

creasing their venous pressure. He showed that if the veins of a pedicle become engorged, torsion may go on without any other additional force. It is well known that the veins of pedicles are longer than the arteries associated with them and that their walls are thinner and stretch easier than the more muscular walls of the arteries. A slight pressure on a pedicle insufficient to interfere with lumen of its artery, may be sufficient to compress the veins, bring about their dilatation and elongation, and cause them to describe a spiral around the unchangeable parts of the pedicle, the connective tissue and artery. Such spiral turns of the veins may, according to Payr, carry the cyst, if not too large, around the pedicle and bring about torsion.

With so many factors favoring torsion, we should find it to be a frequent complication of ovarian cyst.

Going over our operative records for the last five years we found in fifty-one operations for ovarian cysts nine cases of torsion, or 17 per cent. F. Schauta(2) gives his percentage of torsion in ovariotomies as 23 per cent. and M. Hoffman(3) as 9 per cent. J. Pfannenstiel(4) while giving an average of 20 per cent., calls attention to the great variation in the percentages in the various clinics (from 47 per cent. in B. Kustner's clinic to 5 per cent. in A. Martin's), and explains this variation by the different degree of readiness with which patients apply for operative relief from uncomplicated ovarian cysts.

The statistics just cited show that torsion is a very common complication in ovarian cysts, and therefore deserves more attention than it has been receiving in text-books and from writers in general.

Before going on with the subject we shall first cite briefly the histories of our cases.

Case I.—Mrs. A. K. Patient of Dr. B. B. Wechsler, twenty years old. Married two years, one child one year old. Menstruation regular and normal. For last three or four months the patient was suffering with severe pain in left ovarian region, radiating to the left hip. The pain was almost continuous and was frequently accompanied with chills. The day before admission to the hospital the patient was seized with a very severe pain in the left ovarian region, which could not be relieved by the usual anodynes. In addition to the pain she suffered from nausea, constipation, fainting spells and nervousness. On admission to the Montefiore Hospital, September 18, 1909, pulse was 92, temperature 100°, respiration 24. Her abdomen was tender especially on the left side, but not rigid and a tumor could be made out in the hypogastrium. On bimanual examination this tumor was found tense and very painful. Its mobility could not be established on account of pain.

The uterus was retroverted and the right ovary prolapsed and cystic. A diagnosis of a possible localized pelvic peritonitis with tuboovarian abscess was made.

Operation Sept. 18, 1909. A preliminary posterior-colpotomy for exploration and drainage was made and bloody serum escaped through the incision. A dark-looking cyst was exposed with retractors and diagnosis of torsion of ovarian cyst was made. The tumor was found inaccessible through the posterior culdesac and laparotomy was therefore performed. A left-sided parovarian cyst, not adherent, lying above and in front of uterus, twisted on its pedicle one and one-half complete turns, was found. The pedicle was ligated and tumor removed in the usual manner.

The tumor, conical in shape, 6 × 4 × 3 inches, presented a thin almost transparent wall. The vessels of the walls were dilated. The tube, except for the small part used in the pedicle, was drawn over two-thirds of the surface of the tumor and did not show any marked changes. The pedicle consisting of the inner part of the tube, broad ligament and ovary with its ligament was dark greenish in color and the ovary on section presented normal tissues with hemorrhagic spots regularly distributed through it. The fluid within the cyst cavity was clear and slightly bloody. The inner surface of the cyst presented very few deviations from normal. Torsion of parovarian cyst. The patient made an uninterrupted recovery.

Case II.—Mrs. A. S. Case of Dr. M. G. Schlotbom. Fifty-three years old, seven children, the youngest ten years old; menopause five years. Patient has been complaining off and on for over a year of abdominal pain. The pain usually beginning in the epigastrium, radiates to the pelvis. It is accompanied by gastrointestinal disturbances and is aggravated by constipation and exertion. These disturbances lately have been becoming more severe. She also noticed lately a gradual enlargement of the abdomen. For the last two days patient was confined to bed.

On admission to the Western Pennsylvania Hospital, March 21, 1911, the abdomen was found tightly distended by a big mass tender to touch, filling the whole abdomen. Temperature was 102°, pulse 110, respiration 20. She looked toxic and her blood showed 1,650,000 red cells, 11,800 leukocytes, 70 per cent. hemoglobin; urine was negative. On vaginal examination the uterus was found small and low, adnexa could not be mapped out on account of the tumor filling the pelvis and abdomen. Diagnosis of torsion of ovarian cyst was made.

Operation March 21, 1911. Laparotomy. Bloody serum found free in the abdominal cavity. Parietal peritoneum looked normal. A large tumor was exposed, dark greenish in color. It was twisted three complete turns on the axis of its pedicle, which consisted of the right tube and ovarian ligament. Extensive adhesions to the omentum were found and freed. The cyst being too large to be delivered through the incision, was emptied with a trocar and 4000 c.c. of bloody fluid was collected. The pedicle, the size of a finger, was ligated, and the tumor removed. The tumor was a unilocular cyst. Its interior presented in places hemorrhagic and exudative deposits; necrotic spots were found in many places. Torsion of a unilocular glandular cyst. The patient continued toxic the first week after the operation, but made a good recovery and was discharged May 2, 1911.

CASE III.—Mrs. A. M. Aged twenty-seven years. Married nine years. Has four children, the youngest six months old. Is nursing her child and therefore has not menstruated for about fifteen months. Has dysmenorrhea, otherwise the periods are normal. Since childbirth six months ago patient has had five attacks of pain in left lower quadrant accompanied by vomiting and weakness and insomnia. The previous attacks were sufficiently severe to confine her two or three days in bed. This last attack came on July 20, 1912. It began with sudden severe pain in the left ovarian region, nausea, vomiting, constipation and abdominal distention.

On admission to the Western Pennsylvania Hospital, July 23, 1912, the patient's temperature was 98.4°, pulse 80, respiration 22. The abdomen was rigid and distended by a large tumor extending from the pubic region to above umbilicus. It was tender on pressure and not movable. On vaginal examination the uterus was found replaced backward and somewhat to the right. The right ovary was mapped out and the left one was not. The mass felt somewhat fluctuating. Diagnosis of torsion of cyst was made.

Operation.—July 25, 1912. Laparotomy. Large abdominal incision. A large ovarian tumor was exposed. The entire anterior wall was covered by the adherent omentum and two loops of small bowel were firmly adherent to its left side. The adhesions were freed. The tumor was found greenish gray in color and in places necrotic. The pedicle was twisted three times, two turns must have been from previous attacks, for after separating the omentum from the anterior wall of cyst, a separate omental band was seen adherent to innermost two twists. The tumor was removed in the usual manner.

The tumor 8 1/2 × 8 × 6 inches was dark gray color. Its pedicle was short and consisted of inner side of tube, broad ligament and ovarian ligament. The tube and ovary were lying in normal relations to each other and uterus. The ovarian cyst was comparatively thin walled, unilocular and contained 1600 c.c. of thin dark brown fluid. The interior of the cyst was of light gray color, hemorrhagic in places. The ovary microscopically showed immense distention of the blood-vessels. Torsion of an intraligamentous cyst. The patient recovered without any complications, except that she had to be catheterized eleven days after operation. She was discharged August 16, 1912.

CASE IV.—Mrs. M. R. Patient of Dr. Bixler, thirty-three years old. Has three children, the youngest twelve months old, still nursing. Her menstrual history is normal. Last period twenty-one months before present illness. Pregnancy and nursing. Patient has had pain in the left side for a few months. August 10, 1912, late in the evening, after a long horseback ride in the country, she noticed a slight bloody discharge from the uterus. Early the following morning getting out of bed the patient was seized with a sudden sharp pain all over the abdomen, so severe that she could not move. The pain was continuous. Her abdomen became distended but there was no vomiting. When seen in the evening her temperature was 100.2°, pulse 100, respiration 24, leukocyte count 24,000. Her pain was excruciating. On examination the abdomen was found rigid and exceedingly sensitive to touch. A round mass regular in shape could be mapped out.

The patient not being aware of the existence of a tumor and her case having been diagnosed as chronic appendicitis on previous and different occasions, there arose a question in diagnosis between pregnancy with acute appendicitis and torsion of cyst. On account of the great tenderness, a bimanual examination was made under ethyl chlorid anesthesia. The uterus was mapped out and found normal in posterior portion and left ovary prolapsed. Diagnosis of torsion of right ovary was made.

Operation at the Western Pennsylvania Hospital, August 13, 1912. Laparotomy. A large cyst about the size of uterus at full term, twisted twice on its pedicle, consisting of the tube and ovarian ligament, was found. The parietal peritoneum was dark red in color. There were no adhesions, but some free yellowish-brown fluid in the peritoneal cavity. The tumor lay more on the right side and a partial turn of the tumor toward the left was necessary for its delivery. Clamps were applied to the pedicle before ligature and the tumor was removed. The tumor 9 × 6 1/2 × 5 1/2 inches was dark blue in color, irregular in its wall thickness, consisted of two cavities both of which were filled with pseudomucinous contents mixed with blood. The tube was about 4 inches long and 1/2 inch thick. Its fimbriated parts were free and open. The interior of the cyst was dark red. Torsion of multilocular glandular cyst. The patient made an uncomplicated recovery and was discharged September 2.

Case V.—Mrs. M. L., Chickory, Pa. Aged twenty-seven. Married nine years. One child eight years old (preventing conception). Menstruating every two or three months, scant flow, severe dysmenorrhea, last period five months ago. For the last four or five years patient has been having occasional attacks of severe pains in the left side. During the last two weeks she had two attacks of severe pain in the left side of abdomen which radiated to the hip, thigh, vagina and settled in the pelvis. She was chilled and vomited a few times with the pains. She experienced a great deal of pressure on the rectum and was constipated. Urination was difficult and painful.

On admission to the Montefiore Hospital, May 27, 1913, the temperature and pulse were found normal, her general condition was good. There was some tenderness on pressure over the left ovarian region and a tumor could be felt in the hypogastrium. The bimanual examination showed a large uterus of about four months, pregnancy and a hard conical immovable tumor wedged into the left side of the posterior culdesac. The diagnosis of a pregnancy with left-sided mass was made and a vaginal exploratory operation decided upon.

May 28, 1913, a posterior colpoceliotomy was made. A reddish fluid came away from the incision. A dark greenish conically round tumor was exposed. So firmly and completely was it adherent to the pelvic wall that it looked like an extraperitoneal growth. After separating it from the adhesions, it proved to be a twisted cyst. The pelvic cavity was carefully walled off with vaginal pads and the cyst exposed. With a Record syringe introduced into the tumor a fluid was obtained which proved to be the contents of a dermoid cyst. The wall of the cyst was grasped with two Allison forceps. A small incision was made between them. The contents of the cyst consisting of sebaceous material and hair was removed, care being taken not to soil the peritoneum. The opening was then clamped and ligature applied to the twisted pedicle after compressing it with forceps and the tumor was removed. The colpoceliotomy incision was closed, leaving a small opening for iodoform gauze drainage.

The tumor was about 6 inches in its longest diameter and its color dark blue. In places it was raw, presenting here and there areas of necrosis. The pedicle, consisting of the uteroovarian ligament tube and broad ligament, was bluish and its twists were adherent. The number of twists could not be made out. The interior of the cyst was rough reddish in color and in places covered with fine hair. Torsion of a dermoid cyst. The patient made an uninterrupted recovery and was discharged from the hospital May 21, three weeks after the operation.

October 23 the patient was normally delivered of a healthy boy. Except for a mild phlebitis, puerperium was normal.

Case VI.—Mrs. J. E. Aged twenty-sevn. Patient of Dr. J. M. Jackson. Married six years, two children, one miscarriage before the first birth. Youngest child two years. Menses slightly painful, otherwise normal. Last period Sept. 15, 1913. About the end of June patient had an attack of severe abdominal pain, chiefly on the left side. The pain lasted a day and never occurred again until Sept. 25, when getting out of bed in the morning she was seized with the same severe pain and vomiting. The pain continued in the same location for about one-half day and then settled low in the pelvis. During the attack the patient was badly constipated and complained of frequent and rather difficult urination. There was abdominal tenderness but no rigidity.

On admission to the Western Pennsylvania Hospital the pulse was 92, temperature 100°, respiration 22, leukocytosis of 18,000. A left-sided irregular mass extending from the pelvis to the level of umbilicus was found. The mass was tender to the touch, tense and slightly movable. On bimanual examination the fundus of the uterus was found displaced backward and somewhat toward the right side; the right ovary was easily palpated; the left ovary was not found. A diagnosis of torsion of left ovary was made.

Operation.—October 2, 1913, seven days after last attack. Postcolpotomy. Free brown fluid found in the pelvis. Mass could not be reached through vaginal incision. Laparotomy was performed. A dark red left ovarian cyst somewhat oblong firmly adherent to the sigmoid and bladder was found. It was twisted from right to left twice on its dark pedicle, consisting of ovarian ligament and tube. The pedicle was compressed with a clamp and ligated in the compressed band thus formed. The tumor was removed and additional ligatures applied for safety to the individual blood-vessels.

The tumor was a unilocular parovarian cyst of dark red color, somewhat oblong, 8 × 6 × 5 inches. The dark red pedicle consisted of the inner side of tube and ovarian ligament. The tube was about 3 1/2 centimeters in diameter; its outer portion was flatly drawn over the surface of the tumor about three-fourths of an inch wide with the fimbriated end open, but spread out for a distance of about 2 inches. The interior of the cyst was almost of the same color as the external surface, dark red, and its contents were a clear, thin and reddish fluid. The ovary was reddish black, slightly enlarged, lying in proximity with the pedicle, and microscopic examination by Dr. V. L. Andrews showed it to be so infiltrated with blood that very little ovarian tissue could be found. Torsion of an intraligamentous cyst. The patient made an uninterrupted recovery and was discharged October 29, 1913.

CASE—VII. Mrs. A. W. Patient of Dr. S. Zabarenko, thirty-five years old, weight 240 pounds, married seventeen years, has one child fifteen years old. Her menstruation has always been normal, last period January 1, 1914. Four months ago on rising she had an attack of abdominal pain, nausea, vomiting and tympany. Her pulse and temperature were then normal. She was confined to bed only two days. Three days before admission to St. Joseph Hospital, on getting out of bed, she was seized with epigastric pain which later shifted to the right inguinal region. The tumor, the existence of which was known to the patient for a number of years, began to rapidly increase in size. Gradually the temperature and pulse went up; dryness of tongue, anorexia, restlessness, insomnia and obstipation developed, but there was no vomiting. The abdomen became more and more distended, rigid and tender.

On admission to the St. Joseph Hospital the patient looked toxic. The abdominal mass was found filling the entire abdomen. Her temperature was 101°, pulse 120, respiration 30. On vaginal examination the uterus was found anteverted and the lower part of the tumor filling the pelvis behind it. Diagnosis of torsion of cyst was made and the operation was performed Jan. 14, 1914.

Laparotomy.—Bloody fluid was found in the peritoneal cavity. The peritoneum was deeply injected. A few omental adhesions to the tumor were found and separated. The tumor was a large left ovarian cyst, dark red in color, twisted one complete turn from right to left. It was untwisted a half turn in order to deliver it through the incision. The pedicle consisted of the ovarian ligament, inner part of tube and broad ligament, was clamped and tumor removed; the vessels of the stumps isolated and ligated; the broad ligament sutured and abdomen closed.

The tumor, oval in shape, weighed 9 1/2 pounds; 10 × 6 × 8 inches in size. It presented bluish-red appearance and in places glistening pearly gray, rather regular in contour. The tube 7 1/2 inches long and three-fourths of an inch thick was of dark red color, its fimbriated extremity spread over the cyst and open. The mesosalpinx was markedly thickened. The interior of the cyst held 2000 c.c. of blood-stained pseudomucinous fluid and presented one large cavity into which projected a mass composed of a fine honey-combed meshwork of small cysts with mucinous contents separated by very thin septa. The interior of the cyst was dark red almost black. Torsion of multilocular glandular cyst. The patient made an uninterrupted recovery and was discharged February 5, 1914.

Case VIII.—Miss J. L., Case of Dr. J. M. Jackson, twenty-two years old. Single. Menstruates regularly, last period January 10. Patient has been having dull pain in right ovarian region for several years. Four months before admission to the hospital she had an attack of sharp pain in the right inguinal region and was confined to bed for over a week with a diagnosis of appendicitis. January 30, while walking up a hilly street, she was seized with a sharp sudden pain in the right side which lasted only a short time. During the night she was awakened with a severe pain of the same nature. She soon became nauseated and vomited. There was then no temperature nor leukocytosis. During the next day patient noticed, for the first time, an abdominal tumor, reaching the level of the umbilicus by the next evening.

On admission to the Montefiore Hospital, January 31, 1912, the abdomen was found distended on the right side by a tense smooth mass which was tender on pressure and somewhat movable. On rectal examination the mass was found somewhat fluctuating, independent of the uterus which was found normal in size and retroposed. Diagnosis of torsion of right ovarian cyst was made, and an operation advised.

Laparotomy January 31. No fluid was found in abdominal cavity. A right ovarian cyst size of a cocoanut of bluish color, smooth, without any adhesions, twisted in two complete turns from left to right on a pedicle, consisting of the ovarian ligament and internal portion of tube, was found. The tumor was delivered in its entirety through the incision, was untwisted and removed.

The tumor wall was of dark bluish color, unilocular, thick with hemorrhagic infiltration; the intracystic fluid was serous and bloody. The interior was smooth dark red. The pedicle was also dark color; the tube was drawn over the greater part of the tumor, its fimbriated extremity lying flat on the cyst. Torsion of parovarian cyst. The patient was discharged as cured February 22, 1913.

Case IX.—Mrs. E. B. S. Case of Dr. Lawrence Litchfield. Aged thirty-five. Five pregnancies. Two miscarriages. Youngest child five and one-half years. Since childbirth coitus reservans to prevent conception. Menstruation regular until the last year when she began to menstruate every three weeks. Last two months menstruation has been regular again. Last period three weeks ago. Patient has been having for the last two years off and on pain in the lower left side of the abdomen with radiations to the left lumbar region and the inner side of thigh. She had four rather severe attacks. The first one two years ago lasted about one-half day; the second four months ago just a few hours. These two attacks were rather mild. The third one two months ago was very severe and came on while getting out of bath tub shortly after cessation of menstruation. This attack confined her to bed three days. She had then a rise of temperature. Her pain in the left gluteal region radiated down to the hypogastrium and the left thigh and was especially severe the first two days. She vomited once. During this attack she noticed a tender mass in the left side below umbilicus. Since the second attack this mass seemed to appear and disappear and only bothered her occasionally when she put her corsets on. The last attack of pain began five days ago in the same location as in the previous attacks, but two days before admission to the hospital the pain shifted to the umbilical region. This last attack was not as severe as the third one and did not confine her to bed.

On admission to the Montefiore Hospital, Sept. 4, 1914, the temperature was 100°, pulse 90. On examination an abdominal movable tumor could be mapped out reaching above umbilicus. It was slightly fluctuating, not painful to touch and resembled a pregnant uterus. On bimanual examination the uterus somewhat movable could be mapped out in front of this mass. The ovary on the right side felt normal. A diagnosis of torsion of left-sided ovarian cyst was made and immediate operation advised.

Operation.—Sept. 5, 1914. Laparotomy. About 6 ounces of light reddish fluid was found in the abdomen. A left ovarian cyst twisted three times on its pedicle from right to left was found. There were no adhesions. The pedicle consisted of the thickened tube, fixed to the tumor, but its fimbriated extremity was free and patulous. The ovarian ligament constituted a part of the pedicle and was enlarged. The tumor was untwisted from left to right without emptying it. It was ligated and removed in the usual manner. Chronic appendicitis with adhesions was found and appendectomy performed.

The tumor was dark red in color at its upper part. The posterior wall was grayish color with very many irregular hemorrhagic spots. The pedicle was also grayish. The tumor was conically shaped, 10 inches in its longest and 6 inches in its widest diameter. The vessels were found very much distended. On opening it 32 ounces of thin sebaceous fluid escaped. In the sack were found two balls of dark hair about 3 inches in diameter and a mass projecting from the inner wall with two knobs all covered with thin hair.

The whole interior was deep brownish dark color. Torsion of a dermoid cyst. The patient made an uninterrupted recovery.

Going over our own cases as well as cases collected from the literature we find that torsion most frequently occurs in multipara. Out of thirty-one cases in which the number of births are specified, seventeen (about 55 per cent.) are multipara, eight (about 26 per cent.) nulliparæ and six (about 20 per cent.) primiparæ.

The most common age for torsion is between 20 and 40. The youngest we found in literature was two years old,(5) the oldest sixty-seven.

Torsion was found to occur more frequently on the right than on the left side, the proportion being 3 to 2. Tait attributes the greater frequency of right-sided torsion to the alternate filling and emptying of the rectum.

PATHOLOGICAL CHANGES IN THE TWISTED CYSTS.

When an ovarian tumor twists itself upon its pedicle in a degree sufficient to obstruct the return circulation, definite pathological changes take place. These changes are usually slow in their development and vary in accordance with the degree and rapidity of torsion.

As a result of torsion the veins and lymphatics of the pedicle become compressed and venous stasis is gradually introduced. With the appearance of stasis, hemorrhages and transudation of serum take place within the wall and cavity of the twisted cyst. The wall assumes a dark blue or dirty brown color and the cystic fluid rapidly increases in quantity and becomes bloody. Under such conditions, especially after the obstruction of the arterial blood supply a necrotic process is introduced unless it be checked by the formation of adhesions. This formation of adhesions is brought about by the areas of raw surface on the cyst resulting from destruction of its superficial epithelia. These raw surfaces becoming attached to neighboring organs bring about adhesions which reestablish the circulation and cut short the destructive process in the cyst. When adhesions do not form and necrosis occurs a fatal toxemia from absorption of the necrotic products follows. Occasionally, however, the contents of the necrotic cyst become absorbed and its tissues calcified or the cyst tears itself off from its pedicle and becomes adherent to surrounding organs. Under such conditions the necrotic process is arrested and the cyst remains harmless in the peritoneal cavity. In this connection, it is interesting to note the case of Hausman in which a torsioned cyst tore itself loose from its attachment, formed adhesions to the omentum and later became twisted upon the newly formed omental pedicle.

THE SYMPTOMATOLOGY.

The symptomatology, judging from our cases and from the study of the literature, does not seem to be in direct relation to the extent of the pathology found in the cysts.

In some cases the symptoms of torsion come on suddenly—in others gradually. Some of them are so gradual in onset as to be completely overlooked. Thus Hausman(6) found torsion (two and one-half turns) of a dermoid cyst in a case he operated for a diagnosis of tumor and amenorrhea, the patient giving no other symptoms; Davis(7) found an unexpected torsion in a case of Cesarean section; Ward(8) operated on a case of uterine bleeding of four weeks' standing and discovered an adherent twisted dermoid. Litzenfrey(4) performed a laparotomy for abdominal pains of four years' standing and the operation revealed a twisted (four times) adherent necrotic ovarian cyst.

In most of the cases, however, the symptoms come on acutely and many of them give histories of previous acute attacks. Even in patients seen during their first acute attack, we frequently find a history of more or less pain for a long time prior to the attack. In our own cases one gave a history of six acute attacks, one of four, and four of two, all of these patients feeling well between the attacks. Three of our cases gave a history of abdominal pain for some time preceding the torsion.

The acute symptoms of torsion usually resemble those of peritonitis. Severe pain is the most prominent symptom. It usually starts in the ovarian region of the side involved, but it sometimes begins as epigastric, pelvic or abdominal and then shifts to the seat of torsion. In one of the cases it started in the sacral region and in another in the left hip. Frequently the pain radiates from the primary seat to the other regions, most commonly to the inner side of thigh. In one case the primary ovarian pain radiated to the gall-bladder, in another to the vagina, in still another the pelvic pain was accompanied by severe paroxysmal pain in thigh and arm. The character of the pain is not alike in the different patients. In some cases the pain is continuous, with slight exacerbations, in others it is short, sharp and severe, reminding one of gall-stone and kidney-stone colic.

Next to pain the most general symptoms are gastrointestinal disturbances. They are found in almost all acute cases. About four-fifths of them give a history of vomiting at the beginning of attacks. In almost all severe cases a history of initial vomiting is obtained. In some cases vomiting recurs with each attack of pain, in others it does not. The attacks may begin with nausea to be followed possibly next day by vomiting. Three of our cases did not vomit at all in spite of the rise of temperature and of the very pronounced pathological changes in the tumor and peritoneum.

A still more general symptom is constipation. Sometimes it is so obstinate as to suggest a diagnosis of bowel obstruction. Secord(9) actually made an artificial anus to relieve a supposed case of obstruction, which three days later, in a subsequent operation, proved to be one of a gangrenous twisted cyst with extensive adhesions.

Abdominal distention is another common symptom. This may be due to the changed position of the cyst during torsion, bringing its more prominent part forward into the most roomy concave part of the abdomen, but in most of the cases it is caused by hemorrhage or transudation of serum into the cyst-cavity. Occasionally tympanites is responsible for the distention.

Abdominal tenderness is rather frequently met with in the acute cases, especially during the first few days. This symptom is found in cases which present advanced nutritional disturbances with ascites or peritoneal inflammation. In bad cases muscular rigidity accompanies the tenderness. Such cases usually show a moderate rise of temperature and pulse.

A high pulse and temperature are seldom met with in torsion cases.

Urinary symptoms of torsion are rather interesting. They consist of dysuria or difficult and frequent urination. It was reported in nine cases, two of our own and seven collected from the literature. In five urination was painful; in four it was found difficult and frequent. These urinary disturbances are ascribed by Pfannenstiel to the twist of the uterus. I believe it is possible however for the torsioned cyst itself to bring about pressure on the ureter and thus cause the annoying urinary symptoms. Berard, quoted by Pfannenstiel(4) reports a case in which ureteral dilatation and pyelonephritis were found as a result of a torsioned cyst with twist of the uterus and broad ligament.

Another symptom of interest found in torsion is uterine bleebing possibly caused by an acute passive congestion brought adout by pressure on one of the ovarian veins. We found it reported in five cases. In a case of Dr. Ward(8) the uterine bleeding lasted a whole month and was the only symptom that operation was undertaken for. Among our own cases two nursing women began to bleed from the uterus with the onset of torsion.

Symptoms of collapse and fainting are occasionally met with. They are usually attributed to intracystic or peritoneal bleeding. We found five such cases. None of them had peritonitis or adhesions. The cystic fluid in all these cases was found to be bloody, and in only one case reported by Strauss(10) was bloody serum found free in the peritoneal cavity. The three positive features found in all the collapse cases were the very severe pain, the rapid growth of the tumor and the presence of blood in the cystic fluid.

COMPLICATIONS.

These are the most common symptoms of torsion as we find them. Of course, these symptoms are greatly modified by those of the complications which are met with in torsion.

We called attention above to the toxemia as a sequela of the necrosis following torsion. While itself a very serious sequela, the toxemia sometimes brings about complications that are fatal, independently of it. Ohlshausen called attention to acute nephritis and Stoeker to acute yellow atrophy of liver as complicating the toxoemia of torsion (cases of Broese(11), Strauss(10) and Stoeker).

A complication of rather serious consequence is rupture of the torsioned cyst. The increased intracystic pressure would make one suppose that rupture is a common complication of torsion, but this is seemingly not the case. Neither in our own cases nor in the literature have we met many such complications. Nor is rupture of a twisted cyst always fatal. Its results depend a great deal on the size of the vessels torn and on the degree of toxicity of the cystic fluid. A cyst with a fluid of low toxicity ruptured through an area poorly supplied with blood-vessels may cause comparatively little additional disturbance (Strauss's case(10)).

There is another important and interesting complication occasionally met with in torsion, *i.e.*, the involvement of neighboring organs in the twists. Such a complication may occur when an organ, most commonly omentum or loop of bowel, becomes adherent to the ovarian tumor prior to the occurrence of torsion. When torsion of the cyst takes place, the adherent bowel or omentum may take part in the torsion with the pedicle (case of Dr. Payr(12)). This complication may also occur when the twisted tumor lying in the abdominal cavity is pulled down into the small pelvis as a result of its shortened twisted pedicle, carrying with it a loop of bowel. As the cyst rapidly enlarges in size its pressure on the bowel gradually increases thus inducing in it (bowel) necrotic changes (case of Dr. Derera (13)). Again, as a result of torsion, the pedicle may become short and tight and the organs with which it is brought in contact may become constricted to the point of interference with their circulation or function (compression of the ureter in the case of Beard(4)).

DIAGNOSIS.

Torsion of a cyst is a serious accident and frequently demands immediate attention. The early diagnosis of this condition is, therefore, very essential. The cases in which torsion comes on gradually frequently present so few symptoms referable to the ovarian cyst that it is completely overlooked. When a cyst is found in the pelvis, the development of new pelvic symptoms unaccountable by findings, should, in view of the frequency of torsion, bring up for consideration the possibility of a twisted cyst.

In an acute case in which the previous presence of the cyst is known, a diagnosis of torsion should be easy. We have to differentiate torsion from pelvic inflammation, inflammation of the cyst, gall-bladder or kidney colic, ruptured ectopic, appendicitis, appendicitis with pregnancy, perforation of bowels and perforation of stomach. If the pain and tenderness are localized over the tumor, the presence of which was known to the patient, especially when a history of rapid increase in its size is obtained, the diagnosis is simple. But when the presence of the cyst is unknown to the patient the diagnosis may not be so easy. An attempt must then be made to decide whether the abdominal mass is an ovarian tumor. A pregnant uterus with pathology to account for the acute symptoms may be mistaken for a torsioned cyst especially in a stout patient with a rigid abdomen. In such cases anesthesia may be necessary to aid in diagnosis.

Again, we must remember that a patient with an uncomplicated cyst may have symptoms suggestive of torsion, the symptoms being due to such diseases as cholelithiasis, appendicitis, etc. Such possibilities should be borne in mind and must be excluded in the usual way.

The diagnosis of torsion may be much easier after the acuteness of the attack has passed. With the tenderness relieved the mass can be better defined, the uterus and appendages more conveniently examined and the exact seat of pathology better located.

A history of frequent attacks of pain out of proportion to the low temperature and pulse is a valuable diagnostic point. Left-sided torsion, on account of the exclusion of appendicitis and gall-bladder, is easier to diagnose.

PROGNOSIS.

That torsion does not always lead to a fatal termination is shown by the many cases that give histories of previous severe attacks from which they obtained relief for a variable length of time. A favorable outcome of torsion is expected in cases in which the circulation is reestablished by adhesions to surrounding organs, by the untwisting of the pedicle, and the formation of new capillaries. Cases that do not regain their circulation undergo necrosis and terminate fatally if not operated upon.

Complications, such as rupture of the cyst, the involvement in the twist of surrounding organs, acute nephritis and acute atrophy of the liver add a great deal to the danger of torsion.

The operative prognosis is generally good. Even the presence of peritonitis and ascites do not seem to affect the results unfavorably. There were no deaths in our cases and of the four deaths found by us in the literature, one was due to acute nephritis, one to yellow atrophy (both secondary to toxemia), one to perforation of sigmoid caught in the twist, and one to sepsis.

TREATMENT.

Recognizing the dangers of torsion we must adopt only one line of treatment and that is operative. Pregnancy is no contraindication to the operation. Our Case VIII and another case of ours of torsion of the right adnexa during the fourth month of pregnancy (to be reported elsewhere) went to full term and were delivered of living children.

While the abdominal route is simple and safe, the vaginal route may be preferable in cases in which the twisted cyst is easily accessible through the vagina. The good result obtained from the vaginal ovariotomy in our Case V shows that in favorable cases it can be safely and successfully used.

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JENKINS BUILDING.

DISCUSSION.

DR. CHANNING W. BARRETT, Chicago.—One of the chief points of interest is that ovarian cysts with twisted pedicle very frequently come on with pregnancy, some either occurring during the pregnancy or at the time of labor, or directly after the delivery. The question is how to deal with an ovarian cyst and yet save the ovum. In a series of cases collected the percentage of frequency of abortion following operation was almost in direct proportion to the trauma done beforehand. The further question that was brought out in this series was what to do with the ovarian double cyst, there being the rather common notion that if both ovaries are removed abortion will take place. Abortion did not occur in the series of double removal of the ovaries, but slightly than in case of removal of a single ovary, and that is easily accounted for by the extra manipulation of taking out two ovarian tumors rather than one.

DR. ALBERT GOLDSPOHN, Chicago.—We can, if we look carefully, inspect the outer part of the cyst wall near its pedicle, and frequently see macroscopic evidence of Graffian follicles, and I have repeatedly dissected out that outer layer carefully, ligated the vessels without compromising the main pedicle, and folded the flap up and stitched it, and menstruation has followed from that.

The main thing I want to say is that Dr. Menge now of Heidelberg, has gone a step further, and has done the same thing whether there is any macroscopic evidences of Graffian follicles in the structure or not, and menstruation has followed.

Dr. Hugo O. Pantzer, Indianapolis, Ill.—Enlarging upon what Dr. Goldspohn has said, that ovarian tissue in cases of ovarian cysts has been found quite distant from the hilus, a German author has recently published an article in the Centralblatt fuer Gynecologie. He refers in one instance to finding ovarian tissue high on the side of the cyst, quite remotely to the hilus, or where one would alone expect to find it.

Regarding the frequency of serious twisting of the pedicle of ovarian tumors, I have had a unique experience. I have had fourteen cases of torsion of ovarian cysts in fourteen consecutive months, and then none in more than two years.

Dr. Sanes (closing).—In our series we had no bilateral torsions. We think, however, that after operations for bilateral torsions of ovarian cysts complicated by pregnancy the possibility of abortion should be great. Operations for unilateral torsion cases do not seemingly interfere with pregnancy. Besides the reported case of torsion of an ovarian cyst complicated by pregnancy, we had one of torsion of right tube and ovary. The operation was performed during the fifth month of pregnancy. No abortion followed.

The point I want to emphasize is the value of vaginal ovariotomy in some torsion cases. In one of our cases the operation was undertaken for exploration of an immovable mass in the pelvis to left and behind the pregnant uterus. When the diagnosis was made, after separating the firm and extensive adhesions, the ovariotomy was performed through the vaginal incision. The normal delivery that followed four months later indicates the possibilities of the vaginal route in such cases.

The diagnosis of torsion of cysts is sometimes very difficult. In one of my cases the diagnosis rested between pregnancy with appendicitis and torsion of cysts. The woman did not menstruate for about fifteen months on account of the last pregnancy and the lactation. She also gave a previous history which pointed to appendiceal attacks. No history of tumor was given. On examination a right sided tumor was found. The diagnosis between pregnancy and appendicitis on one hand and torsion on the other was considered. A careful pelvic examination was made under anesthesia. The uterus and left ovary were mapped out and the diagnosis of torsion was made.

SOME THOUGHTS AND VIEWS ON THE MORE COMMON GYNECOLOGIC CONDITIONS NECESSITATING OPERATION.*

BY

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THERE is no necessity for presenting a paper on this topic before this society, as far as any immediate usefulness or benefit it may be to its members. But each of you can see the results it will have upon the general practitioner who does his own minor gynecologic surgery, by such methods that in a vast number of instances he converts a minor case into a major one, through his lack of knowledge, experience and technic. The proceedings of this Association are read throughout the United States by practitioners of medicine, and a consensus of opinion promulgated here to-day will in my judgment be of great weight and value to a large number who are not qualified, but do assume to do this work and through lack of training and experience obtain results that are infinitely more serious than the original complaint. Finally the patient comes into the care of an experienced man who finds a condition that requires a major operation to give relief, and restore health, through the sacrifice of the organs of reproduction.

Each member of this Association must be impressed with the increasing number of cases coming to him suffering from pelvic abscesses, with a history of having had a curetment a few weeks earlier following a miscarriage or childbirth at term. Or less frequently following a sewing together of the torn muscles of the pelvic floor and perineum in which, through faulty technic, an infection has arisen. Still another frequent condition, and that is, a curetment to relieve an endometritis with profuse leukorrhea in which there is tubal suppuration that is not recognized, and the trauma has relighted the slumbering process in the adnexa with all the complications that may follow to endanger the life of the patient.

No one should undertake or advise a curetment of the uterus

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that has not a trained touch, and is capable of determining the condition of the uterus, tubes and ovaries.

A uterus fixed, or with *impaired mobility*, requires more than curetment. The red lantern of danger should be hung out. A misplaced, or fixed uterus in place, will not be improved by curetment; on the other hand, serious complications usually follow careless and partial work.

I shall briefly speak of the technic of treating abortion. If but *one* of the *two* usual symptoms are present, *i.e.*, pain or hemorrhage, conservative treatment can be used and often the threatened miscarriage can be averted. But if the patient is suffering pain with hemorrhage, it is not best, in my opinion, to attempt conservative treatment, but at once take steps to save the great loss of blood that usually occurs. Put patient in bed, shave vulva and pubis and prepare vagina and external parts as if you were to do a curetment, trachelorraphy or perineorrhaphy. I pack the cervix firmly with 1 per cent. iodoform gauze using a long strip made up of numerous shorter ones tied together. After packing firmly the cervical canal the vagina is filled with the balance of the strip. A T-bandage to hold a sterile gauze pack over the vulva is used. The packing of the cervix increases the uterine contractions and the packed cervix and vagina prevents loss of blood. In twenty-four hours usually (occasionally forty-eight hours), the gauze is removed and the fetus and membranes are found expelled in the upper vagina. If not, the cervix is dilated to a degree that with the gloved finger or suitable forceps the uterus can be thoroughly emptied. A thorough flushing of the uterine cavity with sterile saline solution hot, will remove all blood clots and small decidua. A generous aseptic gauze pack is kept over the vulva communicating with a small strip just within the introitus, thus insuring steady drainage for a few days.

Perineorrhaphy.—I feel that there are more failures in this operation than successes. You see so few good muscular results; too many skin and mucous membrane affairs affording no relief to the woman. The old idea still prevails that the denudation of mucous membrane, butterfly in shape, down to the fascia, rolling it together with sutures, will give relief. But it does not, as the torn retracted muscles are left undisturbed. The method I use does not require the removal of tissue. An incision in the median line of the posterior vaginal wall down to the fascia and exposing the fibers of the sphincter ani muscle which is to be attached to the torn perineal muscles, is all the cutting required. With spear-pointed scissors double cutting edge, the fascia is punctured on one side and the scissors spread and pulled out. This will expose your muscles and the muscles thus seen can be picked up and united by interrupted catgut sutures. An important suture is the one that unites the levator ani to the sphincter ani muscle. A running suture to unite the fascia over the muscles and another bringing together the mucous membrane completes the operation. All suture material is animal, thus making the after-care simple. Catheter is used for forty-eight hours —three times in twenty-four hours.

The immediate repair of the pelvic floor and perineal lacerations following labor should be a routine performance, and the gynecologist should be called in to do it in the large majority of cases, for as yet we have *too* few properly trained in obstetrics that pursue the general practice of medicine. When the cases of miscarriage and labor at term are carefully and efficiently taken care of, the work of the gynecologist will be so reduced he will be forced to widen his field of work, or starve.

536 Rose Building.

OPERATIVE FINDINGS IN TWELVE CASES OF CHRONIC INTESTINAL STASIS.*

BY

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(With fifteen illustrations.)

It may be said that the indifference with which Sir Arbuthnot Lane's earlier pronouncements concerning chronic intestinal stasis were received has been largely overcome. Skepticism may have been the impelling force in overcoming this inertia, but it is safe to say that attention, thus directed to the subject, has been maintained by genuine interest. However gained, it has continued, in increasing measure, and stasis may to-day be rightly denominated one of the great questions before the medical world. For some years, medical societies and medical journals have been more or less concerned with dissertations on Lane's theories and his clinical findings. The *pros* and *cons* of the matter are being thoroughly threshed out in the mills of experience and controversy. Internists, gastroenterologists, radiologists, pathologists, and surgeons,

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are taking part in the discussion of this important and seemingly far-reaching question of chronic intestinal stasis and its treatment.

The one important part of the output of grist from the mill of controversy and discussion is the establishment of the facts of the *existence of the adventitious intraabdominal structures*, to some of which Lane has been calling attention since 1887, and to which he has applied the term, "evolutionary bands," and of the condition which he has described as "chronic intestinal stasis."

Around these two facts have developed some very creditable work by different investigators, and quite an interesting and valuable literature. There are still controversial questions involved, but there is good reason to believe that we are on the right road and are making progress toward their solution.

Some observers are studying the subject with special reference to one particular phase, others another phase; the correlation of the knowledge thus obtained must be fruitful of good results in the matter of reaching definite conclusions which, in time, may be pronounced the consensus of opinion. Some are interested in the etiology or pathogenesis of the various adventitious structures. Others, from the point of view of the radiologist, are adding their data with reference to the diagnosis of the conditions resulting from these "veils," "bands," "folds," and "membranes." Internists and gastroenterologists, as a rule, direct their attention largely to the treatment of these conditions by nonsurgical means. The surgeons reserve the right, as occasion seems to demand, to resort to operative procedures, such as cutting and suturing bands, short-circuiting, colectomy, or other surgical measures. Some have not joined the ranks of the optimists, but still register among the pessimists. They are busy discovering flaws in Lane's line of reasoning; in detecting the impossible in his pathology; in condemning him to the category of the hopeless hobbyist. They see in his propensity for exploring new fields, the danger of riding his horse to death, as a distinguished pathologist has expressed it. They have conjured up night-mares in the form of "small minds and untrained"—"immature surgeons of two continents," who, following these "phantasms of a disordered imagination," are apt to "inaugurate an era of short-circuiting, performing this or the yet graver colectomy for all sorts and conditions of disease in all sorts and conditions of men, women, and children, on the smallest possible pretext."

Lane himself, referring to the attitude of some of his conferes, says: "When I first began to draw the attention of the profession to the great part played in the life history of the individual by a delay in the passage of material along the alimentary tract, and drew a parallel between the human digestive canal and a drainage system, my observations were treated as being the fantasies of a vivid imagination. Later, when the accuracy of these observations was being tested in the field of hard fact, the more progressive observers began to realize that my premises were not so fanciful as had at first been supposed. Now, the subject of chronic intestinal stasis, and its disastrous sequelæ, is occupying the attention of the profession more and more completely every year."

I am glad to be able to count myself among the small number of those who, from the first, have received his views with open mind, and have been content to follow Lane's footsteps as an investigator, not accepting unqualifiedly all his theories, but being open to conviction. Thus, for eight years and more I have been following, at first hand, his work and his cases. I have had the privilege of examining many of his patients before operation, of watching Lane verify his diagnoses at the operating table, and of examining these same patients, on successive annual visits to London, after operation. I have studied the subject of chronic intestinal stasis from many points of view, not forgetting the far larger group of patients who should never be compelled to have recourse to surgical intervention. I have endeavored to maintain the spirit of open-mindedness, believing that there is here a great field for investigation and a reasonable hope of doing lasting good to many by means of both nonsurgical and surgical treatment.

It is important, it seems to me, to study the human digestive canal as a great drainage system, the human body, if you please, as a house, and the digestive system as the drainage plant of the house. It is important, too, to consider this sytem as a *whole*, remembering that defects in one or more parts are apt to derange the whole plant. It is well to study the matter by beginning in the cellar, so to speak—the rectum—as would a plumber in looking for defects in the plumbing system of a house, and to work up to the attic—the stomach—then to reverse the order and to work from above downward.

By following this method of study I have been able to find the adventitious structures in the abdomen, to which Lane has so persistently called attention, and which he has so clearly described. I have also been able to demonstrate to my own satisfaction, and to the conviction of assistants and many who have witnessed the operations, the kinks in the intestine which these bands cause, and the resulting dilatation of the involved portions of the drainage canal. The diagnosis thus established at operation, has been confirmed, in a large proportion of cases, by the improved condition of the patient after surgical treatment.

So many observers have verified the existence of the bands, which have come, without his will, to be known as "Lane's bands," and the resulting kinks, which many are accustomed to designate as "Lane's kinks," that these particular matters are gradually emerging from the category of controvesy, and are now very generally accepted as facts.

The etiology of the various "bands," "folds," "veils," and "membranes," is still a subject for discussion, and has given rise to an unfortunate terminology which has tended in a measure to obscure the more important issue of their existence and effects.

The condition of stasis which results, however, from the kinking of the gut by these bands, is, as I have said, fairly well established, while the immediate and remote results of this stasis is still a subject for discussion.

It is not my purpose, on this occasion, to discuss any of the theories which still furnish a camping ground for opposing advocates. Nor is it my intention at this time to dwell upon the classification of cases, or upon the treatment of cases of the different classes.

I wish merely to present a series of cases, selected from hospital and private practice, as illustrations of several points, accepting, for the sake of argument, we will say, that Lane's major premises are correct. These points I shall consider categorically and briefly:

(1) The possibility of making the diagnosis of chronic intestinal stasis by clinical examination alone, without the aid of *x*-ray or fluoroscopic study.

(2) The verification of the diagnosis, by the discovery at operation of the bands and the kinks.

(3) The discovery, in certain instances, of conditions which may be interpreted as corroborative evidence of the correctness of Lane's theory regarding the possible remote effects of chronic intestinal stasis.

DIAGNOSIS.

At the recent meeting of the American Röntgen-Ray Society, at Cleveland, I presented a series of twelve cases, giving a comparison of the radiographic with the operative findings. I emphasized the great importance of the *x*-ray and the fluoroscope, when properly employed and the plates intelligently interpreted, as aids to diagnosis, both as regards the existence of chronic intestinal stasis and the causative bands and kinks, and with reference to the possibility of the remote effects or end results of this condition. The splendid work of Alfred C. Jordan, of London, and others, in this particular phase of radiographic work, is certainly monumental, and should by no means be depreciated. I wish, however, to emphasize the possibility, as shown in the cases which I shall present, of making a positive diagnosis of chronic intestinal stasis by the symptoms and clinical examination, without the aid of the other diagnostic measures. If clinical examination leaves the surgeon in doubt, naturally other diagnostic measures should be employed. When skilfully employed, the *x*-ray is of great assistance in the localization of the various bands and kinks. If the surgeon is not fortunate enough to be able to avail himself of the services of an expert radiographer he must, perforce, rely upon his own diagnostic skill. It then becomes more imperative that he understand thoroughly the mechanics of the great drainage system of the body, and that he familiarize himself with the symptomatology of chronic intestinal stasis.

The symptoms of chronic intestinal stasis are those which result from mechanical changes in the drainage tube. We must take for granted, for purposes of discussion, that Lane's theory with reference to these changes is correct. What, then, are the clinical symptoms in a typical case of chronic intestinal stasis? They may be enumerated roughly in the following order:

(1) Pain or discomfort, usually referred to the region of the duodenum and stomach, but also to portions of the large intestine.

(2) Gastric discomfort, nausea and occasional vomiting, resulting from obstruction to the outlet of the stomach in consequence of ulcer or cicatrization of the pylorus or duodenum, or constricting bands about the duodenum in the neighborhood of the pylorus. These symptoms may be classed under the ordinary category of "indigestion."

(3) Various symptoms which may be catalogued under the term "autointoxication," which Lane has described as "flooding the liver with a quantity of toxic material picked up from the stomach, duodenum, and small intestine, in excess of what the liver, kidneys, and skin are able to deal with." These vary according to the susceptibility of the individual.

Under this head may be grouped a most important set of individual symptoms and physical signs, such as the blotchy appearance of the skin, which is cold and clammy, especially over the extremities;

the cold perspiration, of an offensive odor; the loss of fat; the lumpy condition of the breast; thyroidismus, in some cases; tenderness over the ileum; mental torpor—in fact, the entire symtomatology usually described under autointoxication. Headache, melancholia, inability to sleep, or sleep disturbed by unpleasant dreams, also come under this general classification of symptoms.

(4) Constipation, or, as is sometimes the case, persistent diarrhea. In Case IX, of the series herewith presented, diarrhea was persistent and distressing, and could not be controlled by any of the usual means.

Patients who present a sufficient number of the signs and symptoms briefly catalogued above to warrant a tentative diagnosis of chronic intestinal stasis should be safe-guarded in every way. A Wassermann test should be given whenever there is a probability of syphilis. When the clinical examination points definitely to stasis the abdomen should be opened. Opening the abdomen, however, either with or without *x*-ray examination, is more or less in the nature of an exploratory operation, and is always the last step in the diagnosis of this condition.

VERIFICATION OF CLINICAL DIAGNOSIS BY OPERATION.

The cases which are presented herewith illustrate the possibility of making a purely clinical diagnosis. In each case, as I have stated, the diagnosis was clearly made without the aid of the radiologist. In some instances *x*-ray examinations were made for the purpose of substantiating the clinical diagnosis. In each instance, however, there was evidence, as shown by the symptoms and clinical examination, of marked chronic intestinal stasis.

In briefly detailing the cases I have purposely omitted reiterating the fact that the diagnosis was made of *chronic intestinal stasis.* Inasmuch as my purpose is merely to add to the corroborative evidence by the presentation of a selected series of cases, I shall refrain from giving the general history of the patient, and the treatment employed.

It may not be amiss, however, to say a word concerning the method employed in the making of the pictures of the conditions found upon opening the abdomen. In the first place, I try to have a stenographer present in the operating room, to whom are dictated the findings. The medical illustrator makes a rough sketch of the conditions found just as they appear to him or her at the operation. It requires only a few minutes for the surgeon to demonstrate these to the artist who is skilled in this kind of work. The findings are then checked up by the assistants, and sometimes by visiting surgeons. From this operating-room sketch the artist builds up the drawings, with the assistance of the stenographer's notes, the checkings of the assistants, and the findings of the surgeon. Each picture is, therefore, an accurate interpretation of conditions as actually found upon the operating table.

It is obviously difficult, however, to put into each picture every phase of the pathological condition. Therefore, for the purpose of clarity, without the sacrifice of accuracy, each picture emphasizes some special point or points.

CASES.

Case I.—F. M. G., female, single, aged fifty-three. Referred by Dr. Grace Peckham Murray, New York City. Operation, Alston's Private Hospital, January 28, 1914.

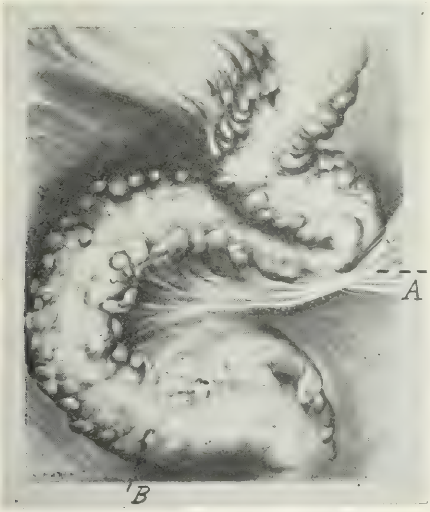

Fig. 1.—*A*. Strong band, causing kinking of the bowel above the pelvic brim. *B*. Rectum.

Operative Findings.—Slight constriction of pylorus; evidence of ulcer on posteroinferior aspect of pylorus, near sphincter. Duodenum greatly dilated; distinct duodenojejunal kink. Bands across pylorus, attached to great omentum and transverse colon below and to transverse fissure of liver above. Mobile cecum, hanging down in pelvis. Fixed band at base of appendix, running under ileum to pelvis. Considerable dropping of transverse colon, hepatic flexure being almost at level of umbilicus, splenic flexure being easily visible, but fairly well supported. Sigmoid very redundant. Distinct external thickening of sigmoid mesentery, with bands anchoring it tightly in an exaggerated "last kink," as shown in Fig. 1.

CASE II.—S. G., female, aged twelve. Referred by Dr. Eliza M. Mosher, Brooklyn. Operation, Alston's Private Hospital, June, 26, 1914.

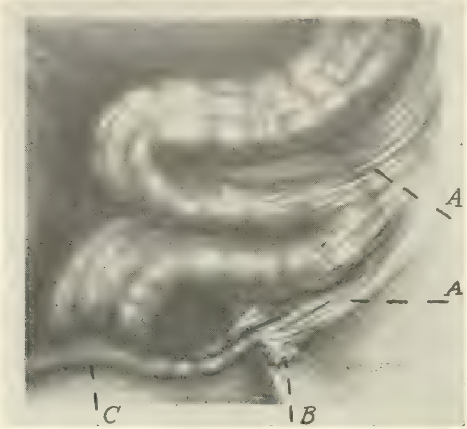

FIG. 2.—*A*. Bands causing kinking of pelvic colon, catching up and enveloping left ovary. *B*. Ovary. *C*. Fundus uteri.

History of epilepsy.

Operative Findings.—Cecum prolapsed and rotated inward and downward around a pivotal axis represented by bands extending from the meso-appendix to the under surface of the ileum. Appendix somewhat congested and adherent to last few inches of under surface of ileum. Distinct angulation 1 1/2 inches from ileocecal valve. Valve not patulous. A band extended from base of gall-

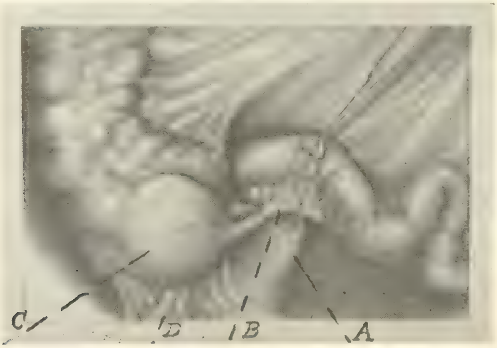

FIG. 3.—*A*. Ileopelvic band. *B*. Appendix adherent to under surface of mesentery and ileum. *C*. Distended and rotated caput coli. *D*. Bands.

bladder across dilated duodenum to greater curvature of stomach, and to right lateral portion of gastrocolic omentum, where it was about a half inch wide. Sigmoid colon very much elongated, with distinct crystallization of the lines of stress over brim of pelvis. Left ovary and tube adherent to these bands (Figs. 2 and 3).

Case III.—C. R., female, married, aged forty-one. Referred by Dr. Isabelle Thompson Smart, New York City. Operation, Alston's Private Hospital, May 30, 1914. Early stasis.

Operative Findings.—Beginning Lane's or ileopelvic band; adhesions of appendix underneath terminal ileum, as shown in Fig. 4. Right ovary cystic and fibrous.

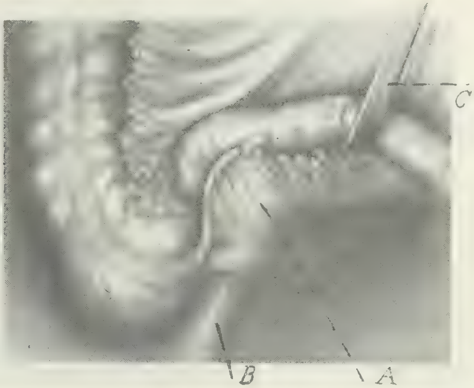

Fig. 4.—*A*. Broad ileopelvic (Lane's) band. *B*. Pelvic brim. *C*. Ileum held up out of cul-de-sac.

Case IV.—R., male, aged thirty-five. Referred by Dr. C. F. Sayles, Miami, Fla. Operation, Alston's Private Hospital, May 28, 1914.

Operative Findings.—Ileum tightly adherent to pelvic floor about four inches from ileocecal valve. Appendix caught in same band and adherent down along ileum. Adhesions from gall-bladder across duodenum and at sigmoid colon. (Fig. 5.)

Case V.—C. M., female, married, aged thirty-four. Operation, New York Skin and Cancer Hospital, June 2, 1913.

Operative Findings.—Great omentum firmly adherent to right ovary, tube and broad ligament, and to apex of bladder, and fundus uteri, by bands, some avascular and some vascular. Laterally, omentum adherent to anterior longitudinal band of ascending colon as far down as ileocecal valve. Adhesions, binding omentum to ascending colon, transverse colon and lateral abdominal wall. Transverse and ascending colons almost amalgamated, making an acute angle at hepatic flexure. Appendix turned under and attached to under surface of mesentery, excepting at its tip. No ileopelvic bands.

Stomach dilated, pulled down and somewhat fish-hooked when

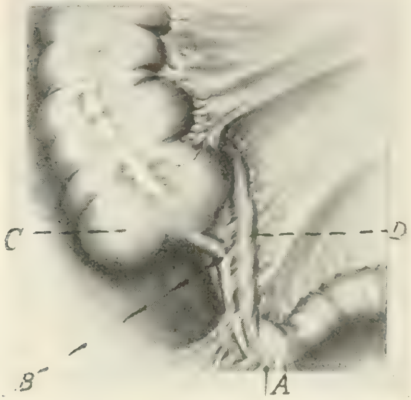

FIG. 5.—*A*. Ileopelvic band. *B*. Attachment of appendix to under surface of mesentery and to ileum. *C*. Cecum. *D*. Ileum greatly narrowed in caliber when large bowel is pulled up toward diaphragm, because of fixed point at *A*.

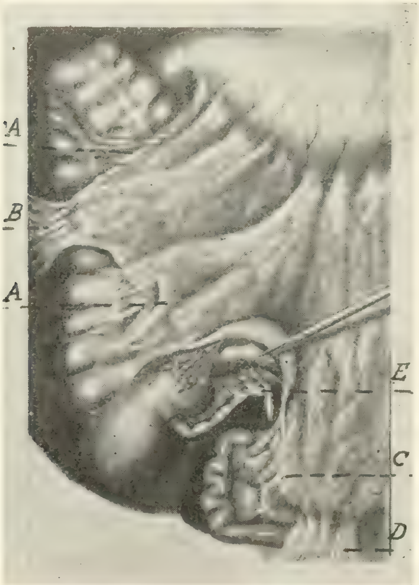

FIG. 6.—*A*. Omentum attached to ascending colon. *B*. Attachment of omentum to abdominal wall, across ascending colon, causing considerable constriction. *C*. Attachment of omentum to ovary and tube. *D*. Attachment of omentum to bladder and fundus uteri. *E*. Appendix angulated and adherent to under surface of mesentery.

traction was made on omentum Gall-bladder normal. No duodenojejunal kink. (Fig. 6)

CASE VI.—A. P., female, single, aged twenty-seven. Referred by Dr. Nan Gilbert Seymour, New York City. Operation, Salvation Army Rescue Home, March 14, 1914.

Operative Findings.—Appendix curved up behind cecum and terminal ileum; greatly enlarged in caliber. An opening had formed between appendix and terminal ileum, this end of appendix being smaller than elsewhere. The appendix constituted an abscess with two openings, one draining into the cecum, the other into the terminal ileum. This hanging up of the appendix was the cause of marked chronic intestinal stasis. The adhesions shown in Fig. 7 had been separated partially before the base of the appendix and terminal ileum were visible.

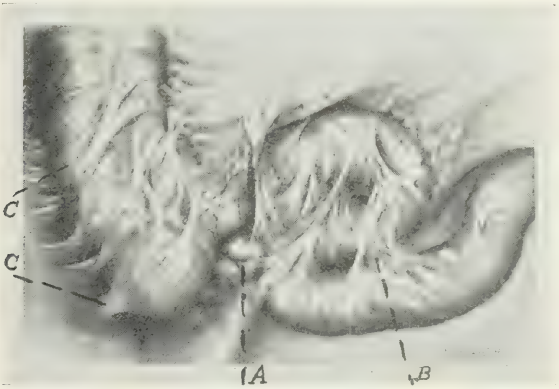

FIG. 7.—*A*. Appendix, forming a cavity, in which was situated an abscess. *B*. Inflammatory adhesions. *C*. Bands of fixation of cecum.

CASE VII.—F. C., female, single, aged eighteen. Referred by Dr. Isaac Arthur Stoloff, New York City. Operation, New York Polyclinic Hospital, April 18, 1913.

Operative Findings.—Stomach somewhat congested, pylorus patulous. Duodenum slightly congested and dilated. Liver normal. Right kidney, which had been stitched too snugly in place in a previous operation, rubbed against last two ribs at junction of the cartilage with the bone.

A strong band of adhesions extended from greater curvature of stomach to the point from which the appendix had been removed at a previous operation, crossing the ascending colon and making an indentation in colon. Another band extended from great omentum further to left, and passed to ascending colon, being fastened to its mesial aspect.

Caput coil and cecum entirely mobile almost to hepatic flexure, not normally supported, and with a rather thickened mesentery. The adhesions formed a fixed point around which the intestine was enlarged. Marked duodenojejunal kink. Redundant sigmoid. (Fig. 8.)

At a second operation, April 23, 1914, a strong band of adhesions was found passing from the base of the gall-bladder across the dilated duodenum and transverse colon (Fig. 9).

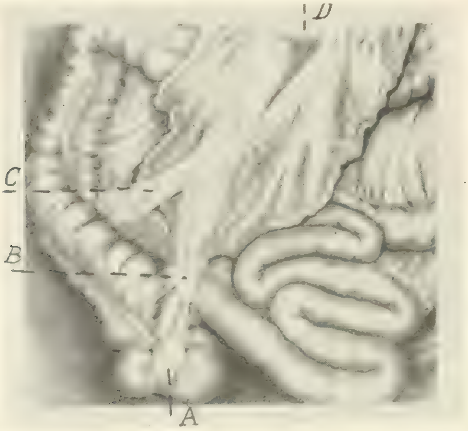

FIG. 8.—*A*. Mobile cecum, with band from great omentum over head of colon. *B*. Same band constricting terminal ileum. *C*. Thickened band from omentum over to ascending mesocolon. *D*. Greater curvature of stomach, which, when patient was in upright position, caused a pull on the head of colon.

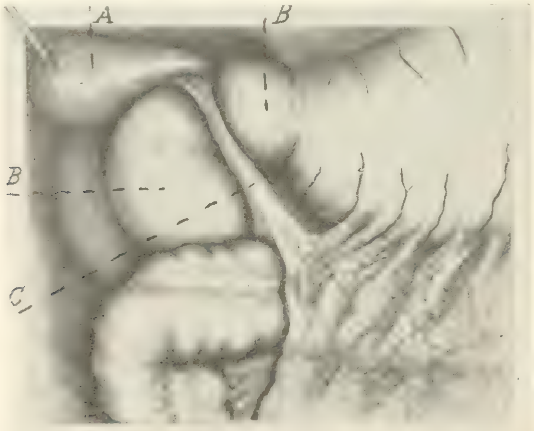

FIG. 9.—*A*. Distended gall-baldder. *B*. Dilated duodenum. *C*. Constricting band.

CASE VIII.—G. G., female, single. Referred by Dr. Hermann Eichhorn, New York City. Operation, New York Polyclinic Hospital, December 19, 1913.

Operative Findings.—Great omentum adherent to lateral margin of ascending colon and to right broad ligament. Omentum dissected away, revealed a band attaching terminal ileum to right broad ligament and to brim of pelvis, causing angulation in the gut, which was greatly distended proximally and collapsed distally to the point of angulation. (Figs. 10 and 11.)

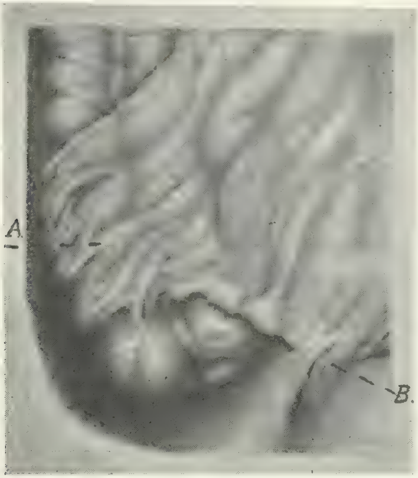

FIG. 10.—*A*. Attachment of great omentum to cecum. *B*. Attachment of great omentum to pelvic wall.

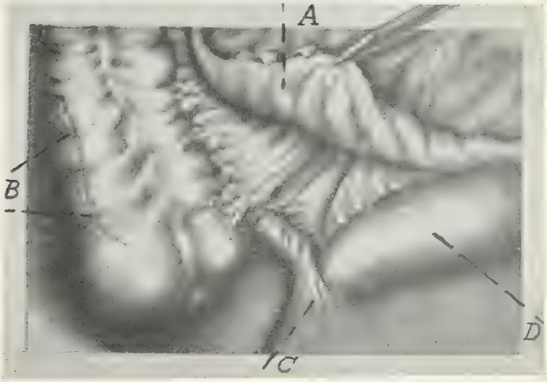

FIG. 11.—*A*. Great omentum lifted up, adhesions cut and tied off. *B*. Raw surfaces on ascending colon covered over by suture. *C*. Ileopelvic (Lane's) band. *D*. Greatly distended ileum.

CASE IX.—J. B. S., female, married, aged forty-four. Referred by Dr. E. H. James, Westfield, Mass. Operation, Alston's Private Hospital, March 29, 1913.

Operative Findings.—Mobile cecum, with distinct bands from cecum to abdominal wall—pericolic membrane—("Jackson's membrane"). Marked prolapse of transverse colon, causing an acute angle of obstruction at the point where the upper margin of "Jackson's membrane" was situated, as shown in Fig. 12. Appendix distended and containing two enteroliths. Ileum showed no ileopelvic bands, but was distended to the size of the ascending colon. Ileocecal valve patulous. When tension on "Jackson's membrane" was relieved by lifting up the transverse colon, this part of the canal became very much distended. Some adhesions at splenic flexure of colon, causing angulation between descending and transverse colon. Stomach, gall-bladder, and liver normal.

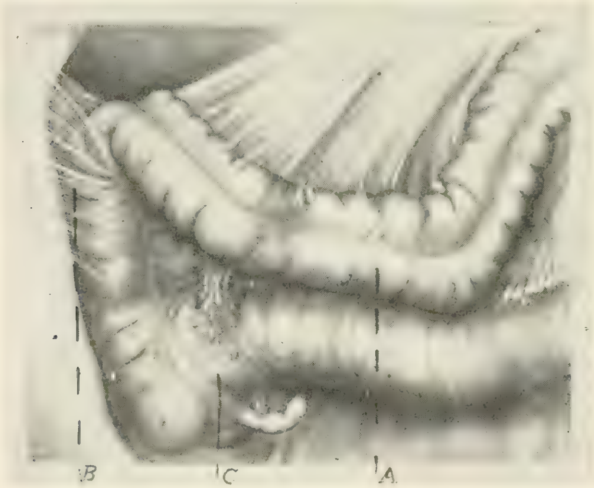

FIG. 12.—*A*. Prolapsed transverse colon. *B*. Pericolic membrane ("Jackson's membrane"). *C*. Patent ileocecal valve.

CASE X.—L. S., female, married, aged forty-nine. Operation, New York Skin and Cancer Hospital, April 30, 1914.

Operative Findings.—Great omentum broadly attached to upper surface of liver just to right of gall-bladder, and extending backward over an area of two inches by three-quarters of an inch in extent; attached for a considerable distance to the parietal peritoneum on the right side, in the vicinity of the attachment to the liver. When these attachments were severed, an extensive scar on the upper surface of the liver was exposed. Firm bands in cecal region, extended from cecum, three-quarters of an inch from base of appendix to parietal peritoneum of pelvic brim. Another band, like a broad thickening of mesentery of the ileum, extended from a point about an inch from the ileocecal valve to the pelvic brim. Appendix lay between these two bands, pointing to the left and slightly downward. (Fig 13.)

CASE XI.—J. T., female, married, aged sixty. Operation, Ossining Hospital, Ossining, N. Y., December, 1913.

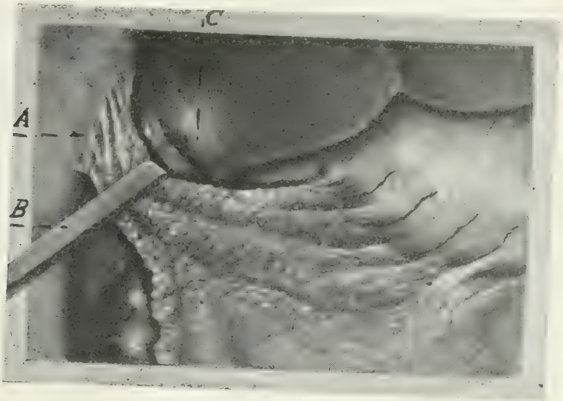

FIG. 13.—*A*. Thickened edge of omentum, adherent to abdominal wall, retracted to show scar on liver (*C*), where irritation by this band caused changes. *B*. Retractor holding back omentum to show scar on liver. *C*. Scar on liver.

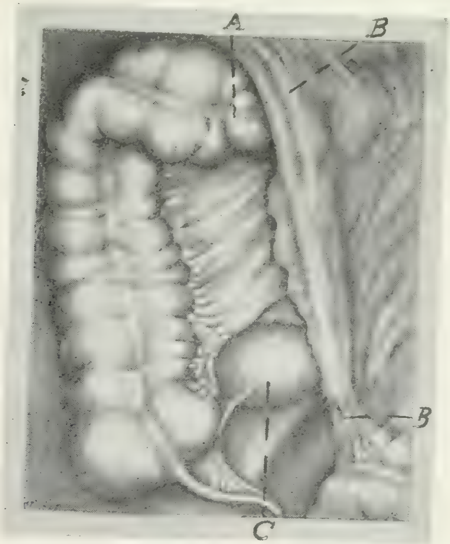

FIG. 14.—*A*. Malignant stricture of transverse colon. *B*. Band of thickened omentum from greater curvature to sigmoid. *C*. Dilated ileum.

Operative Findings.—Malignant stricture of transverse colon. Band of thickened omentum from greater curvature of stomach to sigmoid, directly over site of cancer. Ileum dilated; ileocecal valve patent. (Fig. 14.)

Case XII.—R. C., female, married, aged forty-two. Referred by Dr. Alice Bugbee, New York City. Operation, Bethesda Hospital, White Plains, N. Y., June 8, 1913.

Operative Findings.—Distinct ileopelvic bands; ileum dilated. Gall-stones; beginning cancer of liver in neighborhood of where gall-stones pressed upon liver. (Fig. 15.)

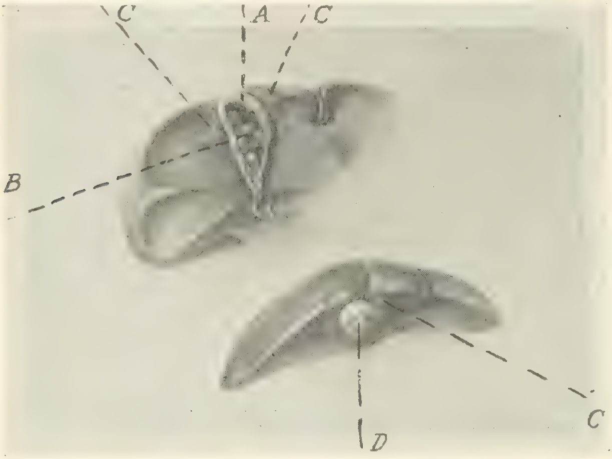

Fig. 15.—*A*. Thickened gall-bladder. *B*. Gall-stones. *C*. Beginning cancer of liver. *D*. Fundus of gall-bladder before opened.

REMOTE EFFECTS OF CHRONIC INTESTINAL STASIS.

In addition to the usual symptoms as observed in a fairly typical case, Lane has called attention to a series of symptoms and diseases which he believes to be the outcome of chronic intestinal stasis, and which have been called the end-results. He has enumerated a rather comprehensive list of diseases which he believes to be traceable to chronic intestinal stasis, or to the lowered resistance which results therefrom, among which may be mentioned, rheumatoid arthritis, tuberculosis, goiter, and cancer. It is to the last-named disease that I wish to direct especial attention in this connection.

I am not prepared to say, at the present time, how far, in my opinion, chronic intestinal stasis affects the development of cancer. The whole problem of cancer is so involved that we can merely hypothecate concerning its etiology. The interrelationship, however, of ulcers of the gastrointestinal tract and cancer of this region of chronic irritation, as shown in Case XII, and cancer, and of these conditions with chronic intestinal stasis, furnishes food for thought.

The last three cases of the series presented seem to me to be significant in the light of some of the possible end-results of stasis.

In this connection I may conclude with a recent statement by Lane: "If the views I hold on the subject are even approximately correct, no bigger question has ever held the attention of the medical profession. It has to do with the ground-work of disease and deals with primary causes, a matter of the greatest moment to us in the explanation of the factors that produce changes in our several tissues, which changes we call diseases, and in the knowledge of the manner in which we can either obviate their development, or alleviate or remove them if they have already developed."

34 Gramercy Park.

DISCUSSION

Dr. George W. Crile, Cleveland, Ohio.—Mr. President: I have been extremely interested in what Dr. Bainbridge had to say, and I am only sorry he did not have more time. I wish he might have had time in which to tell us how he manages his cases. I have watched Lane's work and have specially studied intestinal stasis for a long time. I have felt my way and have done only four operations in indicated cases. In these four cases, as far as they have gone, the results have been satisfactory. The whole question is under discussion and observation by every one, and we should be content to make progress very carefully, even if slowly.

In reviewing my own observations in these cases, I have noticed that in many of them the removal of the appendix does not relieve, in fact I have had a number of disappointments after the removal of the appendix. In each of these cases the appendix showed changes within itself of chronic appendicitis, yet the patient got no relief.

In some of these cases therefore something more than the removal of the appendix is needed. However, I intended that my small contribution to the discussion should be along another line, although I can only touch on it very briefly. As a result of a long series of experiments, only partly published, we can show how some of the contentions of Mr. Lane may be sustained. Aside from what he has given us, we have shown without doubt that in the evolution of man one of the most important developments has been the protection of the body against the infections in the intestinal tube. To me one of the most striking facts in our evolution has been the maintenance of an aseptic territory in the abdomen itself, in spite of the fact that many poisons must be constantly absorbed from the intestinal tube. There has been evolved a powerful mechanism in the body for the purpose of overcoming that infection or poison which we call auto-intoxication and of mantaining the chemical standard of the body in all conditions. You will find that this mechanism consists of a group of organs—the brain, adrenals, the thyroid and liver. This chain of organs is able to split up and protect the body against these poisons absorbed from the intestine.

As to the working out of the practical value of this postulate we all will sense the danger of going too far and perhaps claiming that thus too many of the diseases of civilization which we only partly understand may be accounted for.

DR. HUGO O. PANTZER, Indianapolis.—The forceful clear, convincing and enthusiastic paper given us by Dr. Bainbridge is certainly interesting and instructive. I had my say yesterday, but wish briefly to emphasize, namely, that essentially we have to deal with an intoxication or toxemia. What are the general symptoms of intoxication? The toxemia is not limited to the number of organs mentioned by Dr. Crile. Toxemia by any cause, be it suppuration of the tonsils, decaying teeth, tuberculosis, intestinal stasis, or whatever, toxemia spells *glandular blight.* Both secretory and excretory glands are involved. This blight varies in the degree in which the various glands become involved in individual cases. Thus one case reveals accentuation of kidney involvement, others mark greater thyroid, or liver, or skin involvement, etc.

The withered liver in these cases, revealing a percussion limit at times not more than two fingers in breadth in the axillary line is an interesting observation as yet not chronicled. Under proper medical treatment such a liver will regain its size, and the stools, previously light yellow or even clay colored, will resume normal shades. My observation of such cases goes back fifteen or twenty years.

The study of the symptomatology of toxemia is greatly simplified if we first recognize it to mean a blight of the glandular organs, then ferret out the organs more especially suffering, and finally attempt to locate the focal cause or causes. In the search for the latter the entire body shall be scrutinized.

DR. J. HENRY CARSTENS, Detroit.—Dr. Bainbridge has presented this subject in a beautiful and admirable manner. There are several points I would like to consider. We were taught, more or less, to pride ourselves on the inch and one half incision, and a week and a half in bed, in connection with operations for appendicitis. I have followed that very largely and am still inclined to make small incisions for all kinds of operations, but in the course of time my patients got well and I began to hear about Lane's kink, and now I find that a great many Lane's kinks are found around the cecum, and when I operate for appendicitis, if it is a plain simple case, I always make an incision large enough so that I can *thoroughly explore the surrounding cecum* and see if there are any Lane's kinks interfering with the function of the small intestine or the ileocecal valve. That is one point.

The other point is this: people have constipation and intestinal stasis. I have seen some patients whose bowels did not move for two or three weeks. They had tried Christian Science and a lot of other things, and yet their bowels would not move, and I had to scoop them out, and they did not suffer either from intestinal stasis or Lane's kink. Those people seemed to be in ordinary good health even if their bowels did not move. It is not only constipation and retention of fecal matter but there must be something else. Some of them had evidently great resistance to the absorption of excrementitious matter, and others had not, and they suffered. It seems to me, that ordinarily in the human economy there is great power of resistance, and when a patient has a sound or healthy epithelial layer of the mucous membrane, he or she does not get any of this absorption. There must be somewhere some weak point in the epithelial layer to permit of this absorption, or there must be raw surfaces produced by the food that causes a place where absorption occurs, and you have a peculiar condition of diapedesis of the microorganisms in the intestines into the peritoneal cavity to cause formation of these adhesions.

There is another point that our internal medicine friends speak about and that is joint troubles. In other words, we have all kinds of arthritides, and finally they come to the conclusion that these cases are really infectious. I hold that the infection in all these chronic joint troubles that we run across is caused by these kinks and intestinal stasis and the absorption is the result of those, and those patients who have repeated attacks of joint troubles should not only have the joints examined and *x*-rayed, but they ought to have their abdomens examined and *x*-rayed, and ought to be in the hands of a surgeon instead of in the hands of a general practitioner.

Dr. Frank D. Gray, Jersey City.—Far be it for me to criticise this most excellent exposition, but in listening to the paper I got the impression that Dr. Bainbridge had a method by which he could diagnose these cases without radiography, and as I followed the paper through, the only answer to that, as far as I could see, was that he diagnosed his cases after opening the abdomen and found certain adventitious bands and certain kinks.

I am willing to admit that some of us are not capable of making that thorough diagnosis after we have the abdomen opened, because we may overlook conditions or fail to properly interpret them.

A point I would like to have Dr. Bainbridge elucidate in closing the discussion is, was I right in my supposition that the diagnosis was made by an exploratory operation, and if so, how many cases were submitted to exploratory operation in which these things were not found?

Dr. David Hadden, Oakland, California.—There are two or three questions I would like to ask Dr. Bainbridge. First, whether he considers general colon infection as a secondary condition to the stasis or as the cause of the stasis? Second, personally I have been impressed with the small number of cases I have seen with the rather large proportion of positive complement fixation tests in these cases, and I would like to know in what proportion of his cases there has been specific infection, and how far that may go toward producing these bands and kinks in these cases?

Dr. E. Gustav Zinke, Cincinnati.—A more important subject than the one presented by Dr. Bainbridge could hardly have been brought before the association at this time. It is a subject that is more prominently before the profession at this moment than any other. When the Clinical Congress met in London last July, I think Mr. Lane was the principle attraction on that occasion.

Everybody wanted to see him. Everybody saw him. We were all much interested in him and his work. An evening had been set aside for the discussion of intestinal stasis in which the shining lights of England and America participated. The fact, however, that Mr. Lane attributes nearly all the ills, to which human flesh is heir, to intestinal stasis, embarrassed many of his friends and lessened the effect of his teaching. They gave Mr. Lane credit for his originality, for his investigation, and for his honesty. Nobody entertained any doubt but what he had opened up a new field for investigation. None listened to Mr. Lane in his clinic without being convinced that Mr. Lane is going too far in his views as to the consequences of intestinal stasis. This was vividly illustrated in one case he brought before us: A woman, about forty-five years, was brought into his clinic for the purpose of removing her colon. Preceding the operation, as he always does, with an investigation or examination of all the other abdominal viscera, he found the gall-bladder full of gall-stones, so much so that this organ could be seen by all who had a view of the abdominal wound. Mr. Lane had the gall-bladder in his hand, showed it to his visitors and told them it was filled with gall-stones. He said, "I will not bother about these gall-stones. I will simply remove this patient's colon. The gall-stones will take care of themselves." He did just what he said.

Sir Lane has a strong personality. He has many admirers and is, unquestionably, a man of great merit. I have read, carefully, all he has written, on intestinal stasis, its causes, consequences and treatment; and yet I cannot help but think, like the majority of those who had the opportunity of seeing him at work and listening to him at London during the Congress, that he has probably gone far beyond the line of demarcation of intestinal stasis in all of its phases.

Dr. William Seaman Bainbridge (closing the discussion).—I am very glad that my paper was postponed until this morning; we would not otherwise have had Dr. Crile's able discussion. I am glad to hear from him on this subject and to know that he is, as he says, working out something which will clear up some of the vexed questions concerning stasis. He is always accomplishing something which is not only new but most interesting and helpful. I feel, as he does, that looking at the body as a whole is the key to the entire situation.

Replying to the remarks of Dr. Carstens concerning constipation, I would say that there may be a certain amount of residual feces, just as there is of residual urine. There may be kinks without stasis, and there may be stasis without kinks. There may be stasis with constipation, there may be diarrhea with stasis, and there may be diarrhea and constipation at the same time. In some cases there is extreme constipation, as has been stated to-day, with no absorption from the bowel which is a detriment to the body as a whole.

I have examined athletes whose intestines were filled with a large amount of material, I have had them exercise for hours, finding pronounced kinks, as shown in the bismuth picture. The *x*-ray is certainly of great value when rightly interpreted, and I am not decrying it as a real aid in diagnosis. At the recent meeting of the American Roentgen Ray Society, at Cleveland, in a series of cases I reported, from 80 to 90 per cent. of all essential details were shown by the *x*-ray in conjunction always with the fluoroscope.

In replying to Dr. Gray's criticism regarding the diagnosis, I would like to ask him in how many cases he makes an absolutely accurate diagnosis before the abdomen is opened? In 40 per cent. of the cases of abdominal cancer in the Metropolitan hospitals of London the diagnosis is not made until the abdomen is opened at the operating or postmortem table. I fear we, as a rule, do little better. Many laparotomies are really exploratory. When we make clear that the condition demands that the abdomen be opened, the details are very often discovered afterward. In each of the cases reported the diagnosis was chronic intestinal stasis—sewer-gas poisoning, defective plumbing. In each case there was something that could be accounted for by no other hypothesis. Most of the patients had been under the care of an internist for from five or six months to several years. The urine was examined, a Wassermann was taken, and the cases were studied carefully, every effort being made to effect a cure without surgery. Laparotomy was resorted to after medical means had failed or clearly would not be sufficient.

With reference to the causes, I will say briefly that whether the colon bacillus is found wandering out primarily or secondarily is a debatable matter. Lane believes, as do several other leaders, that the colon bacillus comes out when there is stasis, and is therefore secondary. Others hold the opposite view.

Referring to Dr. Zinke's remarks, I have no doubt that Lane has gone too far in what he said. He has gone further in what he has said than in what he has written, and he has doubtless gone further in what he has written than he will believe in the end. If he has gone too far it is because he has been leading the way. I have heard him say that he does not know where it will all lead us, and that as an initiator if he does not somewhat overstate things the profession will not listen, and humanity will not have the great benefit which this question seems to offer.

Perhaps nineteen out of twenty patients with stasis should never have operative treatment. The cases for surgery must be carefully selected and the type of operation be wisely chosen.

The great truth which Lane has brought to us is the consideration of human drainage—the plumbing of the house in which we live—as essential to health and as an active factor in a large number of human ills. He has opened the door of hope to many a human wreck, and has laid down a plan for the prevention of much disease and misery. The important point is not whether Lane has gone too far—the question is, has he led us on?

A REPORT OF ALL ABDOMINAL CESAREAN OPERATIONS PERFORMED IN THE SERVICE OF THE LYING-IN HOSPITAL, NEW YORK.*

BY

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New York.

We wish to bring before the Fellows and place upon the records of this Association a report of all the abdominal Cesarean sections done in one hospital by a limited number of surgeons acquiring their operative material from the same source. This work has extended over a period of a little more than twenty years. To be exact, from December 24, 1893, to September 10, 1914. By far the larger part of these operations has been done in the past ten years.

The Lying-In Hospital is now writing its sixty-second thousand histories of women attended in its Out-patient Department; its twenty-ninth thousand histories of patients attended in the hospital. Deducting some two thousand cases attended before any Cesarean sections were done and also the abortions, gynecological and the general cases, it is fair to state that this hospital has delivered something over eighty thousand women at or near the full term of their pregnancies during the time given above.

A search of its records shows that from this number of cases, five hundred and seventy-one deliveries have been by abdominal Cesarean section. In five hundred and ten instances, the mother has recovered and has been discharged from the hospital in good condition, except five recent cases whose recovery is assured—now convalescing. The maternal recovery is 89.3 per cent. of the cases operated upon. The postpartum day of discharge of these cases is something of an index of how they recover. The later cases show considerable reduction in the number of days of postpartum care. Thus we find by taking the average day of discharge by hundreds, considerable progress has been made. They are as follows:

First hundred	25th day
Second hundred	20th day
Third hundred	19.2 day
Fourth hundred	17.6 day
Fifth hundred	17.5 day
Sixty-six hundred	17.7 day

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* Read before the American Association of Obstetricians and Gynecologists at Buffalo, Sept. 15–17, 1914.

If we were able to exclude several cases whose recovery was complicated and prolonged—some of them remaining over seventy days—the average day of discharge would be much reduced. It is very near the fourteenth day in the majority of cases.

DEATHS OF MOTHERS.

Sixty-one women have died following this operation, a maternal mortality of 10.7 per cent. from all causes. We may say that a very large proportion of these deaths occurred in spite of rather than because of Cesarean section. Thus, there is a group of thirteen cases of toxemia of pregnancy and eclampsia who died after this operation. Their condition was such that they would have died under any plan of treatment.

There are two classes of so-called border-line cases. First: the clean, uncomplicated cases in whom there is a contracted pelvis or other moderate obstruction in the birth canal or a marked disproportion between the capacity of the pelvis and the child which is to be delivered. In these cases it becomes a matter of very good judgment whether a trial labor shall be allowed or some form of vaginal delivery be attempted, or whether they shall be delivered by Cesarean section. We see a considerable number of women who have contracted pelves in whom we must decide that delivery shall be by Cesarean section if we rely upon pelvic measurements alone. Yet a large proportion of such women have small children capable of being easily molded and are delivered spontaneously or by low forceps operation. In another class of cases of rather limited number, we find the pelvis of normal size and, in some instances, above the normal size, and yet the fetus is so large, the bones of the fetal head are so thick and unmoldable, there is such a disproportion between the capacity of the pelvis and the fetus that abdominal Cesarean section is the only safe way of delivery. Pelvic measurements alone can be relied upon only as a guide rather than final in judging these cases.

There is another class of border-line cases. This class gives us a very high morbidity and mortality in mother and child. We refer to these women, on our own service, who have been long in labor, sometimes with membranes ruptured, or in whom the trial labor has been allowed for an unwarranted time. Many vaginal examinations have been made, or it may be some form of vaginal delivery has been attempted; labor has been persisted in until the mother is exhausted, the fetus compressed and in poor condition. These are apt to be the cases in whom the disproportion between the fetus and pelvis is small, the vertex partially engaged, or the obstruction may be in the lower part of the pelvis. Such cases are rarely badly infected, but they are poor Cesarean risks. Or the cases may come under our care as emergencies after having been long in labor with membranes ruptured, or in the care of midwives, and usually later in the care of private physicians who attempt forceps delivery. Such patients may be admitted in apparently very good general condition, yet already infected, or they may be in poor general condition, very much exhausted and also infected. We are bound to care for such cases as we find them. How shall we manage them? Whatever course we pursue we know that the mortality and morbidity for mother and child must be very high. Some will say that we should do a craniotomy, destroy the child and thus save the mother. It may be said with truth that many of these unborn children are already dead or nearly so; or they may be in good general condition, but already so infected with the same germ which jeopardizes the life of the mother, that, though born in good condition, they soon die from sepsis. If these contentions covered the whole situation, craniotomy would be the only justifiable mode of delivery in these cases. But craniotomy is neither a safe nor an easy operation. In fifteen hundred consecutive cases, one-half from the Out-door Department and one-half from the In-door Department, craniotomy was found necessary one hundred and twenty-two times. Nineteen mothers died, a maternal mortality of 15.5 per cent. Symphysiotomy is no longer an operation to be considered; pubiotomy is less often employed than formerly. The so-called extraperitoneal Cesarean section is on trial. The scope of this paper does not permit us to go far into details concerning the outcome of these cases delivered by Cesarean section, but a considerable number of them, though they experience a stormy and protracted puerperium, recover.

This second class of border-line cases is capable of being very materially reduced. In many of these women the indications for Cesarean section are present and positive from the beginning of labor or before. This should be appreciated, and they should be operated upon while mother and child are yet in good condition. It should be more generally recognized that delay is dangerous, that delivery by high forceps or difficult version—even in hospital surroundings and in the hands of the skilful and experienced obstetricians—is among the most dangerous operations known to surgery. Even under these conditions the results are too often deplorable. Many of us know to our sorrow what the results are in the hands of the unskilled in unfavorable surroundings. The children are apt to be born dead or they are severely injured. The mothers who survive (there are many who do not) are made invalids for the remainder of their days in too many instances. Yet prior to the birth of the child they had the right to look forward to a strong and healthful existence. A homicide occurs in a community, possibly two vicious lives are involved. One of these lives is already disposed of. The police, the legal machinery, the press and public opinion are at once set in motion to save or destroy the other life. Time, public treasure and legal skill are employed without stint. A knowledge of the crime is spread to the limits of our country. Yet the loss of life, the destruction of homes, permanent disability and the sacrifice of the innocent at the time of childbirth is greater, we believe, than that due to homicide. It goes on silently and is accepted without much complaint, because it always has been as it now is. In the presence of appendicitis the medical and lay public is educated to such a degree that the practitioner who allows this condition to drift on unduly, and if he be not a surgeon, does not seek surgical council, and prompt operation where necessary, surely and justly lays himself liable to unfavorable criticism.

We ask that some such condition shall obtain regarding difficult obstetric cases. To some extent death and injury must ever be associated with childbirth. It is our duty to reduce this death rate and injury to the minimum. This calls for better obstetric teaching, a greater willingness to break away from old methods which have been found wanting, a willingness upon the part of those of us who have not been adequately trained to recognize our limitations. And to remember that time, and vaginal interference or the absence of such interference are very important factors in determining what the outcome of a difficult labor shall be. Abdominal Cesarean section is in no sense a cure-all in obstetrics. It is a very valuable agent, and its timely employment will do much to reduce the mortality and morbidity of which we complain as now occurring in obstetric practice.

We report a total maternal mortality of 10.7 per cent. following Cesarean section occurring in five hundred and seventy-one operations. This high death rate is made up largely from neglected and mismanaged labors. It is a comparatively simple operation in the hands of those accustomed to abdominal surgery. It is susceptible of proof from our histories that in clean uncomplicated cases delivered by Cesarean section shortly before or soon after labor begins, the maternal mortality is between 2 and 3 per cent. and there is no fetal mortality in such cases.

In five hundred and seventy-one Cesarean deliveries, five hundred and seventy-seven children were born. Twins seven times. In one case the first twin was born before admission. The second twin had a depressed fracture of the skull from high forceps traction of the vertex against a sharp promontory. The mother was sent to the hospital as a case of rupture of the uterus, which did not exist, and the second child was delivered by Cesarean section.

We count all cases as deaths if they do not live to be discharged alive from the hospital, regardless of the duration of their stay. Of the five hundred and seventy-seven children delivered by Cesarean section, sixty-nine were either stillborn or died before leaving the hospital, a fetal mortality of 12 per cent. Twenty-three or 4 per cent. were stillborn.

From the sixty-one mothers who died following Cesarean section, sixty-two children were delivered. Forty-four children lived. Eleven died, and seven were stillborn.

Eclampsia and toxemia of pregnancy were the indications for Cesarean section in thirty-five cases; twenty-two or 63 per cent. of the mothers recovered. Thirteen, or 37 per cent. of these mothers died. From these thirty-five cases, thirty-seven children were born, twenty-six, or 70 per cent. of these children lived. Eleven children, or 30 per cent., were either stillborn or died. Four were stillborn. Seven died. Period of gestation in these thirty-five cases: Fourteen at the tenth month, three at the nine and one-half month, twelve at the ninth month, two at the eight and one-half month, one at the eighth month, one at the seven and one-half month, two at the seventh month.

Placenta previa was the main indication in twenty-one cases; two of these mothers died from sepsis; twenty-one children were born, fourteen children lived, four children died, and three children were stillborn. The fetal mortality was due to prematurity.

Accidental Hemorrhage.—We find three cases of accidental hemorrhage, the mothers and one child lived. One child was still born; one child was premature and died in a few hours.

Repeated Cesarean Section.—Seventy-eight cases have been delivered more than once by Cesarean section; sixty the second time, fifteen the third time, one the fourth time, one the fifth time, one the sixth time.

Rupture of the uterus in labor subsequent to Cesarean section. This accident occurred in six cases. Three mothers died. Threo mothers recovered. Two children lived. In these two cases the children were in the uterus and alive and were delivered by Cesarean section. Four children were free in the abdominal cavity and dead.

Various Presentations.—Vertex in 512 cases, brow in two cases; face in two cases, impacted; transverse in two cases, prolapsed cord in two cases; not noted, twenty-four cases.

Main indication for Cesarean section was some form of contracted pelvis or deformity of the spinal column in 441 or 79 per cent. of the cases. While malacosteon is reported by Playfair as being a common indication in England for this operation we have seen but one case in the Lying-In Hospital. There are nine cases of some neoplasm occluding the pelvis as the main indication for Cesarean section; and nine cases following some form of suspension of the uterus required a Cesarean operation. In eighteen cases an unduly large child was the indication.

The number of the pregnancies were: one para in 214 cases; two para in 128 cases; three para in ninety-one cases; four para in forty-five cases; five para in thirty-seven cases; six para in thirteen cases; seven para in fourteen cases; eight para in thirteen cases; nine para in four cases; ten para in three cases; twelve para in two cases; thirteen para in one case; fourteen para in one case; not noted, twelve cases.

There have been seven cases of postmortem Cesarean section not included in the foregoing records. Two children were delivered alive. One lived six days. The others lived.

The writer's personal experience with abdominal Cesarean section is limited to 237 operations, 193 of which were reported at the last annual meeting of this association. Forty-four Cesarean sections represent our work in this line from the last report up to the present time. Of 237 cases, twenty-four mothers died. Maternal mortality, from all causes following this operation, 10.12 per cent. In our first one hundred Cesarean operations, there were fifteen maternal deaths; in our second one hundred cases, there were five maternal deaths, and in our last thirty-seven cases, there were four maternal deaths.

Two hundred and forty children were delivered (twins in three cases); thirty-three children were either stillborn or died before leaving the hospital; infant mortality 13.8 per cent.; eleven, or one-third of the infants were stillborn. Dead child before operation, prematurity, long labor, attempts at vaginal delivery, prolapse of cord before operation, and toxemia of the mother are among the more prominent causes of the infant mortality.

REPEATED CESAREAN SECTION.

In the 237 Cesarean sections, the operation was performed more than once on the same patient in forty-one instances; in twenty-nine cases, two times; in nine cases, three times; in one case, four times; in one case, five times; and in one case, six times.

Of these forty-one cases, three mothers died. The first died of sepsis on the fourth day after her second Cesarean. Her first delivery was by this operation in another hospital. In her second delivery, she had been long in labor and high forceps had been attempted before admission to this hospital. The child lived.

The second died of shock and hemorrhage on the third day after her third Cesarean in this hospital. The child lived.

The third had her second Cesarean on January 30, 1909. Good recovery, except fever for one day. Culture from uterus showed colon bacilli. Discharged in apparently good condition, February 14, 1909. Readmitted March 1, 1909, with mural abscess connected with necrotic uterus. Hysterectomy. Died from sepsis ten days later. The child lived.

Rupture of the uterus during labor subsequent to Cesarean section has occurred in three of our cases. All in the first labor subsequent to the first Cesarean section. Two mothers and their children survived; one mother and her child died. Each of these accidents might have been avoided had the mothers followed our repeated instructions and come to the hospital at the first onset of labor, instead of waiting in their homes for many hours in active labor before seeking surgical aid.

A report of forty-four Cesarean operations, which represent our experience, during the past year is here offered in detail: Thirty-nine of the mothers were discharged from the hospital in good condition; twenty-one were discharged between the twelfth and the thirteenth day postpartum. Of these, one was discharged on the tenth, and five on the eleventh day at their own request; nine were discharged between the fifteenth and the sixteenth day; six were discharged between the twenty-fifth and the twenty-sixth day; two were discharged on the twenty-ninth and one on the forty-first day. This last patient was detained at the hospital on account of an operation for hemorrhoids. In this series of forty-four Cesarean operations, five mothers died. Maternal mortality, 11.3 per cent.

MATERNAL DEATHS.

CASE I.—(C.N. 26015.) Bronchopneumonia. Mrs. B. F. Aged thirty-five; para-vi. Obstetric history began in 1906. One abortion at three months. Five full-term children; all very large; all instrumental deliveries. Two stillbirths; three lived five days each. All had birth paralysis. Patient is very large and stout. Funnel pelvis. Thick bones. Internal diagonal conjugate 12.5 cm.

At full term; not in very active labor for eight hours. Very large child (weighed 4930 grams) Vertex could not be made to engage at inlet. Operation uncomplicated. Vomiting a great deal of partially digested food soon after operation. Stomach lavage. Inspiration pneumonia developed on second day. Wound healed by primary union. Uterus involuted well. Patient died on the tenth day. Child lived.

CASE II.—(C.N. 27127.) Antepartum hemorrhage. Partial placenta previa. General peritonitis. Staphylococcus aureus. Mrs. E. B. Aged twenty-two; para-i; at term. In labor, and in charge of private physician who packed vagina with iodoform gauze. Margin of placenta covered about two-thirds of cervical opening. Os dilated enough to admit three fingers. Generally contracted pelvis alone a positive indication for Cesarean section without the presence of placenta previa and hemorrhage. Immediate Cesarean section. Uncomplicated operation. Convalescence unsatisfactory from the start. She died on the eighth day of general peritonitis. Only partial union in the uterine and abdominal wounds. Child lived.

CASE III.—(C.N. 27260.) Mrs. R. H. Aged, twenty-eight; para-i. Male type pelvis, large child. Active labor fourteen hours. Chloroform to surgical degree repeatedly given and repeated attempts at high forceps over a period of five hours by private physicians. Vertex partly engaged. Death in six hours after Cesarean operation from shock and chloroform poisoning. The child lived.

CASE IV.—(C.N. 27470.) Aged twenty-seven; para-ii. Contracted pelvis. First child said to have been delivered at eight months by instruments; stillbirth. Present delivery at full term by Cesarean. Clean case. Herniotomy at this time in midline above umbilicus by overlapping fascia with mattress sutures. Considerable tension. Wound infection. Poor union followed by general peritonitis. Death of mother, seventeenth day. Child lived.

CASE V.—(C.N. 28310.) Toxemia of pregnancy, well-marked nephritis. Aged thirty-two; para-i. In good health until about two weeks prior to admission. Then one of the first symptoms was pronounced epigastric pain. Upon admission, there was very little edema. Moderately diminished quantity of urine; marked trace of albumin; many hyaline and granular casts. Blood pressure 142. In daily examinations for six days, it reached 150 but once. Milk diet, rest in bed, saline irrigations, hot packs, etc., for six days. No perceptible improvement. Suddenly pulse rose to 140 and patient became very ill. Responded to stimulations. Cesarean section within twelve hours. Liver came into view at operation. It was yellow and mottled, the characteristic appearance found post mortem in liver of eclamptic mothers. Bad prognosis given at this time. Convulsions, which had been absent prior to operation, developed soon after delivery and recurred until death which took place within twenty-four hours after labor. The child died on the ninth day.

INFANT DEATHS.

Forty-four children were delivered. Forty-two were discharged from the hospital alive and well. Two infants failed to live.

Infant mortality 4.5 per cent. Of these, one was the child prematurely delivered from the eclamptic mother just reported. It undoubtedly shared the intoxication. One infant was stillborn and macerated. In this case, the mother had a male-type contracted pelvis, with a history of three instrumental deliveries, resulting each time in either a stillbirth or a child which lived but a few hours. Wassermann reaction repeatedly negative. She was almost insanely anxious for a living child, and she reported at regular intervals during the present pregnancy for observation. About ten days before labor, she appeared in great mental distress, stating that fetal movements had ceased the night before. She was very stout. After careful examination, no fetal heart could be heard or fetal movements felt. An examination, eight days later, gave the same result. Patient stated she had felt slight fetal movements in the interval. Two days after the last examination she was admitted in active labor. Vertex presentation; head not engaged. Several examiners were convinced that they could hear the fetal heart. The maternal pulse was very rapid. In this case, the writer expressed himself as not being convinced that the child was living. In view of the previous history of large dead children after instrumental delivery, the divided opinion as to the presence of the fetal heart sounds and the mother's desire for a living child, Cesarean section was done immediately. A large macerated fetus was delivered. The skin was smooth, but its gross appearance was such that it would have been classed as a syphilitic fetus a few years ago. The mother made an uneventful recovery and was discharged on the eleventh day.

INDICATIONS FOR CESAREAN SECTION IN THIS SERIES OF CASES.

In forty cases, well-marked contraction of the pelvis furnished the indication for this operation. In one case, antepartum hemorrhage and partial placenta previa at term and in labor were the more urgent indications. There was also in this case a generally contracted pelvis which, in itself, was a positive indication. In another case, a primipara in labor and unobliterated cervix, eclampsia with repeated convulsions was the indication for Cesarean section. Mother and child lived. Both were discharged, in good condition, on the twelfth day. Premature separation of placenta, antepartum hemorrhage and undilated os were the indications in a third case. This patient ran a septic course after delivery. She and her child were discharged well on the twenty-ninth day. In the fourth case, the indications for Cesearean delivery were the same as in the second case but mother and child died

Ankylosis of the right hip with distorted and contracted pelvis and adduction of the lower extremity was observed three times in this list of cases.

REPEATED CESAREAN SECTION.

Six of these patients were delivered a second time by Cesarean section; two a third time. All mothers and children lived.

The technic of the high operation for abdominal Cesarean section is illustrated with five original drawings. The description of the operation, already published several times, is herein repeated. The first drawing shows the location and relative length of the incision in the abdominal wall. Its lower end is purposely kept about 2 cm. above the umbilicus to avoid weakening the umbilical ring. A considerable number of child-bearing women have a small umbilical hernia without causing any inconvenience. In some cases, in which the abdominal incision extends down to or partially through the umbilical ring, we have seen a small hernia develop months after delivery, and entirely below the scar. The second drawing shows the uterus, after the delivery of the child, held up to the abdominal opening by the long ends of a deep suture at each angle of the uterine wound. The third drawing shows the first layer of uterine sutures in place but not tied. The fourth drawing shows the uterine wound closed by the first layer of sutures and the sutures tied and cut close to the knots. The fifth drawing shows the second and final layer of uterine sutures partly in place. We use here plain No. 1 catgut and practically the Cushing stitch. The needle is passed just outside of the tissue included in the deep layer of sutures and parallel with the line of the uterine wound, taking up peritoneum and going well into the uterine muscle, folding this tissue over from one side and then the opposite, forming a welt which entirely covers the deep sutures and the uterine wound.

The operation is performed as follows: The abdomen is opened by a median incision, 8 to 10 cm. long, from above down to the umbilicus. One or two gauze pads, wet with warm normal salt solution, are placed in the abdomen above the fundus of the uterus to hold back omentum and intestines. Often the uterus is found twisted upon its long axis, usually toward the right side. An assistant, standing beside the patient opposite the operator, makes pressure with his hands against the outside walls of the abdomen, rotating the uterus so that its anterior wall looks directly forward. He must regulate his pressure so that the uterus is held well up to the abdominal opening and hold it there until it is emptied of its contents, and until several of the deep sutures have been placed and tied. This, however, is in no sense a maneuver to control hemorrhage. The uterus is carefully incised so as to keep the membranes (the "bag of waters") intact. The incision may be a little longer than the abdominal opening. It is made from just below the fundus downward. If the placenta is found beneath this wound, a not infrequent occurrence, it should be pushed aside or torn through and, with the hand in the uterus, the membranes should be separated from the uterine wall while they are yet distended. Neglect of this precaution often means that they must later be removed piecemeal, sometimes with much difficulty and delay, after the child is delivered and

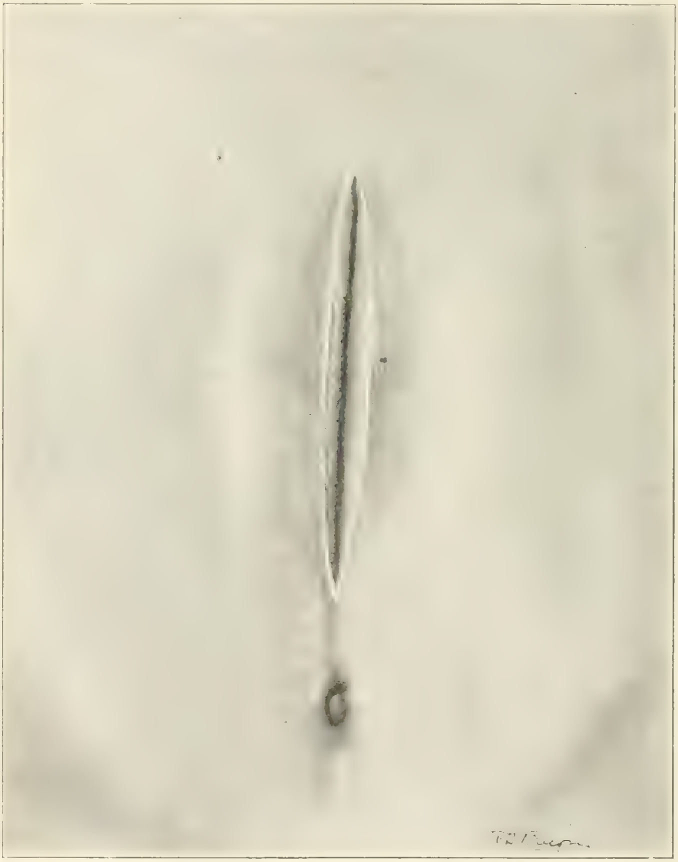

Fig. 1.—The incision.

retraction and contraction have begun. This is the time when dangerous uterine hemorrhage is most likely to occur.

The anterior thigh of the child, or the one which is most readily found, is grasped and extracted. A breech extraction is done. After the shoulders have been delivered the child is turned so that its face looks toward the mother's face. Then with the middle and index-fingers of the right hand astride its neck, and with the same fingers of the left hand in its mouth making traction on the lower

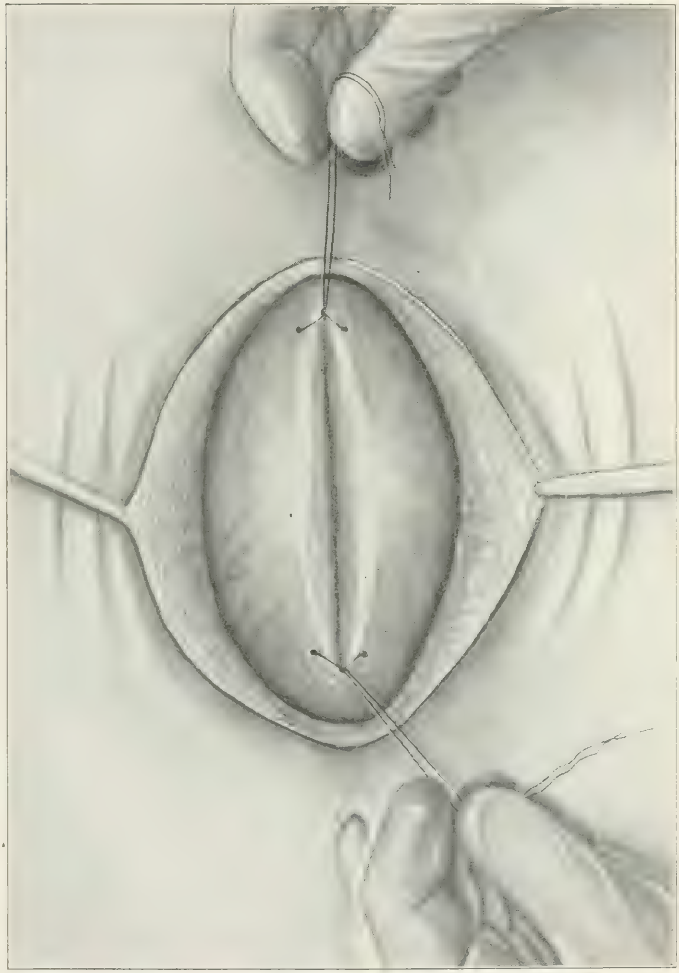

FIG. 2.—The first suture in place.

jaw, the head is carefully delivered so there may be no sudden jolting or lacerating of the uterus. An assistant stands ready with two long forceps with which he clamps the umbilical cord. The cord is cut between the clamps and the child is taken away to have respirations established, preferably in an adjoining room, so that the operating staff's attention may be given entirely to the mother. We now hook two fingers of the left hand into the uterus at the upper angle of the uterine wound, and place and tie the upper deep suture, leaving the ends long. This is repeated at the lower angle of the wound and then with the right hand in the uterus, the placenta, membranes and coagula are removed. The first assistant now discontinues abdominal pressure and holds the uterus up to, but not out of, the abdominal

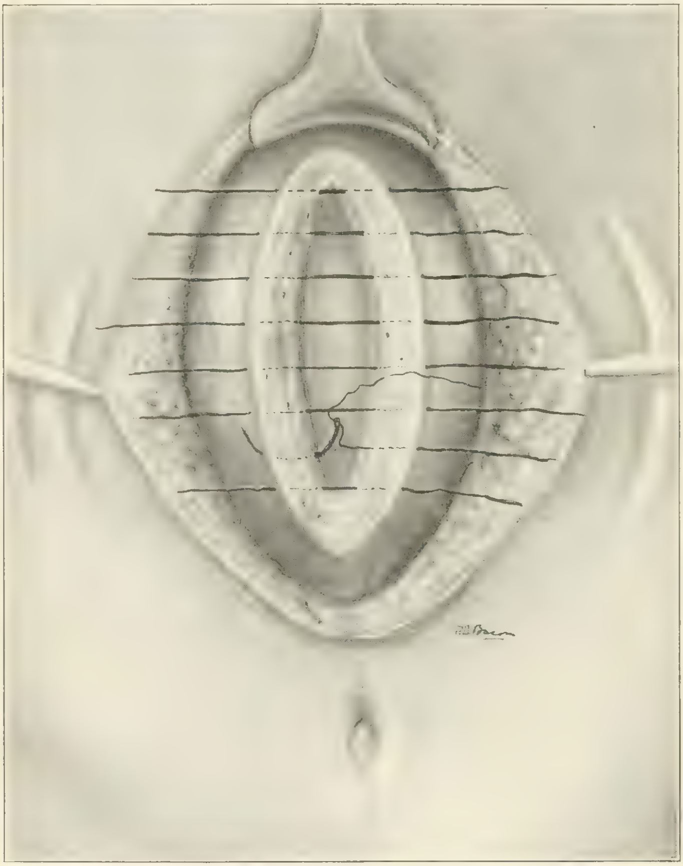

FIG. 3.—Shows sutures in place but not tied.

opening by the long ends of the sutures already in place. The uterine wound is closed by two layers of sutures. The deep layer consists of No. 2 chromic gut, interrupted, and about 1 cm. apart. They are passed through the uterine peritoneum, close to its cut edge, well out into the muscle and down to, but not through, the endometrium and out in reverse order on the opposite side. A double turn is taken in the first knot, which will maintain its position without the necessity of its being held by a pair of forceps in the hands of an assistant, and at the risk of cutting or weakening an important suture with the forceps. The suture is drawn tight enough to bring the edges of the uterine wall into accurate apposition, yet avoiding tension which would blanch and constrict the tissues. The sutures are

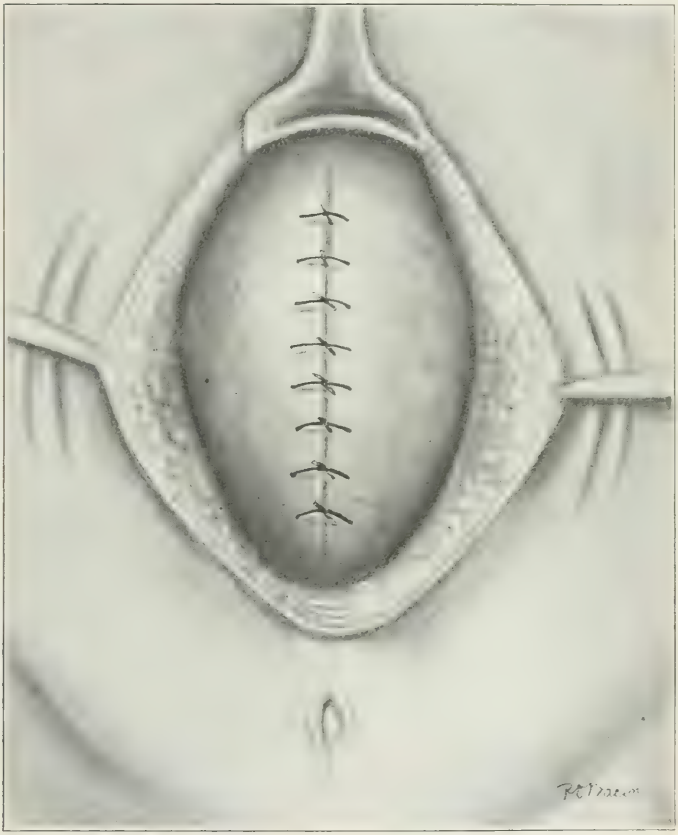

FIG. 4.—Deep sutures tied.

tied in three knots and cut short to the knot. The entrance and exit of the deep sutures are close to the cut edge of the uterine peritoneum, and the short ends of these sutures render it more easy to completely bury them by the next layer which is a continuous suture of No. 1 plain gut. Beginning at the lower angle of the uterine wound, this suture is inserted and tied and the knot is covered by folding the peritoneum over it with subsequent stitches. Passing the needle well outside of the tissue included in the deep layer of sutures and parallel to the line of the uterine incision, the peritoneum and some uterine muscle are caught up, alternately on one side and then the other, folding them over and completely burying the deep layer, much after

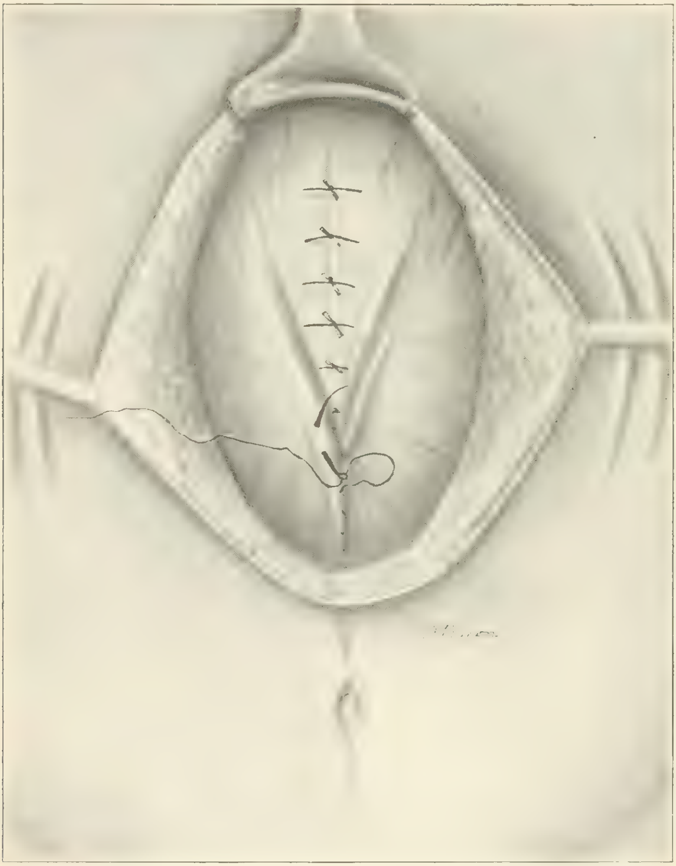

FIG. 5.—Introduction of peritoneal covering suture.

the manner of the Cushing stitch in closing intestinal wounds. This leaves no raw surface, or sutures, or knot-ends, exposed. This reduces to a minimum the chances of subsequent adhesions of adjacent structures to the uterine wound. The deep interrupted suture holds the two faces of the uterine wound in apposition through the whole depth of the wound. If an interrupted suture gives way, it affects only the tissue held by that one suture. If a continuous suture gives way at one point, its force is weakened throughout its entire length. Every precaution should be taken to avoid adhesions and to secure strong, firm union of the uterine wound, so that the uterus may involute normally and take its position in the pelvis with its mobility unrestricted by adhesions and in the event of subsequent pregnancy the uterine scar will not rupture.

The pads are removed and the abdominal wound is closed in three layers. Dry sterile gauze pads are held in place by a snug adhesive strap across the abdominal wound which is an added support to the abdominal sutures. Elsewhere the dressings and binders are loose, so that the uterus, which is new in the lower part of the abdomen in the position occupied by a uterus after normal labor, may have free movement. The compression of the abdominal wall against the uterine wall is thus avoided and likewise the risk of adhesions between the two as was the case where the tight abdominal binder was employed. The uterus is not delivered from the abdomen at any time. The patient is placed in bed with the head of the bed elevated to favor drainage and descent of the uterus. In the uncomplicated case she suffers the pain and discomfort common to laparotomies for other causes but no more. Morphine in 1/8-grain doses is given by hypodermic injection as needed, and the abdominal distention is relieved by a retained rectal tube or by a saline irrigation. Usually the mother nurses her child and at the end of forty-eight hours she is treated as a normal delivery. On the eighth day postpartum, she sits up in a chair and by the twelfth day she is ready to leave the hospital. Several of our patients have insisted upon going home on the tenth day, while others who were ready to go home on the twelfth day, for one cause or another, found it inconvenient to leave at that time, or else they lived at a distance and they were advised not to attempt to travel so soon. In the uninfected cases, the blood and liquor amnii which finds its way into the peritoneal cavity does no harm and no great effort is made to remove it.

We find the following advantages in the use of the small median incision entirely above the umbilicus: There is no danger of adhesions between the uterine and the abdominal wounds, and the uterus is therefore allowed to involute normally and take up its position in the pelvis without restricted mobility.

In the midline the abdominal wall is very thin; no important structures are divided and the tissues are quite elastic, so that a small opening is all that is necessary for the delivery of the child. The small abdominal opening offers much less chance for the escape of intestine and omentum and less opportunity and necessity to handle the abdominal contents. Located above the umbilicus there is much less probability of the subsequent occurrence of hernia through the cicatrix, for it is above the most dependent part of the abdomen which is subjected to the greatest strain when the patient is in the upright position. More support is also given at this point by the recti muscles as they tend to come together toward their upper attachments.

While we have not had an opportunity to examine all of the patients upon whom we have performed this method of Cesarean section, yet there is a considerable number who return for subsequent delivery in this way, or for other causes, and thus far we have not seen a hernia in any of our patients, except in one woman in whom the entire thickness of the abdominal wound broke down, and was closed by granulation. This patient developed a hernia several months later through the site of her Cesarean wound in the abdomen.

42 East Thirty-fifth Street.

DISCUSSION

Dr. James F. Baldwin, Columbus, Ohio.—Mr. President: I think I may say at the outset that we all read with great interest anything that Dr. Davis writes, and I am sure we will be pleased to have the opportunity of reading this paper in full when it is published later in our transactions. I have watched his technic in Cesarean section operations with great interest, and have read all of his reports. Since he brought out the high incision I have resorted to it with very great satisfaction, and have used it except in one or two special cases.

It is always a question in one's mind where we should stop in deciding whether to operate or not to operate. Some of the German operators, who seem to be more anxious about statistics than about human life, refuse operations in which examinations have been previously made, or in which forceps have been used. It has never seemed to me that that was right. I have operated repeatedly on cases in which forceps delivery had been undertaken, and I have repeatedly operated on cases in which there was already present marked evidences of infection. I reported one such case two or three years ago in which the patient had a temperature of 104°, pulse 130. Nevertheless, Cesarean section followed by hysterectomy resulted in prompt cure, and a living and healthy baby. I do not think it is wise under such circumstances to leave an infected uterus *in situ*.

I have always felt I should give the patient the benefit of the operation, provided her general condition was such as to permit the operation to be made with reasonable safety, and provided the condition of the child was such as to indicate that it had a reasonable chance to survive, but in all septic cases hysterectomy should follow the section. Whether the cervix should be closed in the usual way, covered by peritoneum and dropped, or should be brought out at the lower angle of the incision by the Porro method, is optional with the operator. Under these circumstances I always am careful to protect the peritoneum with extra care, and as soon as the fetus is delivered to flush the interior of the uterus, including the cervical canal and vagina, with tincture of iodine. If there is undoubted sepsis present, then a hysterectomy is made, but otherwise the incision is closed in the usual manner.

In his full paper I suppose Dr. Davis mentions other cases than the classical ones for the operation of Cesarean section. Only a few days ago I reported in the Cincinnati *Lancet-Clinic* a case of Cesarean section in which the indication was a breech presentation, with a large child, in an elderly primipara, with remarkable rigidity of the soft parts. I explained to the attending physician, the women having been in labor for many hours, that to allow her to deliver herself, or to deliver her by the vaginal route, would certainly mean a dead child, with more or less maternal laceration. I felt that Cesarean section was indicated absolutely in the interest of the child, and would probably be less dangerous to the mother under the circumstances than vaginal delivery. I operated, and both mother and child did beautifully.

In another case, the patient going home in fine shape with her baby last Saturday, a one-horned uterus was the indication for operation. Fortunately I had made the diagnosis of this condition years before when I operated on the patient for an acute appendicitis. I found then that she had a uterus with only one horn, the left. I warned the parents and the attending physician that if she became pregnant there would be danger of rupture. In due time she married, became pregnant, and was brought to the hospital two days before her delivery. Her labor was entirely inefficient. She was in the hands of a skilful obstetrician who permitted her to remain in labor for twelve hours, and then reported to me that he thought Cesarean section would be necessary as the child was already giving evidences of distress, and no progress was being made. The soft parts were in good condition, but the pains had not been sufficient to cause the head to engage. I then made the usual operation. I did it all the more willingly because of a case which I reported in the *Medical Record* a year or two ago, in which I made a hysterectomy for most atrocious dysmenorrhea and found a one-horned uterus, the other horn being represented by a mass about the size of a walnut, containing a cavity about the size of a grape into which menstruation took place, but the blood having no outlet gave rise by pressure to intense pain, which would last about a week. In this particular case I had known that this patient also had a lump on the right side of the developing horn, and as she had suffered similar menstrual pains I suspected that we had here a similar condition. After completing the Cesarean section, therefore, the walls of the uterus being scarcely thicker than paper, I resected this tumor on the right side, attaching the round ligament to the other horn so as to hold everything up in good position. In examining the tissue removed a cavity was found precisely like that in the case previously reported. In this case I purposely made a low incision so as to reach the entire uterus readily.

Dr. Abraham J. Rongy, New York City.—In order to bring Cesarean section before the profession and have it accepted both by the profession and public we must avoid operating on unclean cases. A mortality percentage of even ten is too high for clean cases. I believe in cases that have been handled on the outside, in which forceps have been attempted in relatively contracted pelves, we still have another operation in pubiotomy cases in which infection is presupposed should not be subjected to Cesarean section but should be delivered by pubiotomy. I have performed nine pubiotomies and have not lost a single mother, but lost two children. If we can point out to the medical profession and to the public a mortality of 2 per cent. for Cesarean section, the operation will be more readily accepted.

With reference to the transperitoneal and extraperitoneal Cesarean section, I have attempted to do the operation described by Dr. Hirst. I found it to be complicated by a good deal of hemorrhage and handling of the tissues and it is not the operation of choice. Cesarean section should be adopted as a routine in primiparæ suffering from central placenta previa. I think the chances for a living child and mother are better by delivery through Cesarean section.

In primiparæ with eclampsia, having a rigid cervix, with no signs of labor, Cesarean section is often indicated.

I am using the high incision in Cesarean section. The uterus is easily brought into full view and the chances for postoperative hernia are minimized. I close the uterus by the two-layer method, using a continuous suture for the muscle and submucosa and a continuous suture for the peritoneal layer.

Dr. Gordon K. Dickinson, Jersey City.—I am not an obstetrician, and I have not brought a baby into the world for a great many years. I have been sitting on the fence watching other fellows do the work. The average "male" midwife which is the usual title given to the obstetrician in towns by the people who employ him, has been reading something about eclampsia and Cesarean section and he speaks of high tension preceding the eclampsia, and I am surprised at the immense number of Cesarean sections that are being done by this class of midwives in sanatoriums, homes, and so on. It seems to me, the men in our association who are doing obstetrics ought to take some stand and make a note of this.

Dr. Davis did not finish his paper. He may have had something to say on Cesarean section for eclampsia and its limitations. Our society should take this matter up and select some man or men to write essays on the subject for next year. There is all together too much Cesarean section work and home work being done for these ailments.

DR. CHANNING W. BARRETT, Chicago.—I have but very few words to add to the paper that Dr. Davis has presented. I think, at the present time, we should exclude Cesarean section in most septic cases. Some claim that the good results of abdominal work in sepsis of the abdomen can be duplicated in delivery through the abdomen, but I have found that the mortality increases very materially with any manipulation that has been carried out from below, especially outside of a hospital. We cannot give a very good outlook for a patient of that kind, even in the most skilled hands. We still have an operative method to fall back on which is not ideal in any sense, but the operation of pubiotomy gives a very high percentage of recovery both for the mother and child unless fatal damage has already been done. I have seen Dr. Davis do this high operation and I must commend it.

DR. WILLIAM MORTIMER BROWN, Rochester, New York.—I cannot let the opportunity go by without adding one note of emphasis to what seems to be the keynote of Dr. Davis' paper, which is a demand for the more careful preliminary examination of cases and better training on the part of the ordinary practitioner in the examination of these patients. We cannot expect to do all the obstetrics. The general practitioner has to do it, but we must demand of him that he take time and prepare himself to sufficiently investigate these cases, so that he can, at least, make a guess as to what he is going up against, and if then he should be required in some way to avail himself of some other help he can let us see them early instead of bringing these cases to us infected and maltreated, and then expect us to get good results. I had thought I was rather unfortunate in my Cesarean operations but since hearing Dr. Davis' paper, I am glad to say, in the small number of cases that I have had the opportunity of taking care of, some thirty-three or thirty-four in number, I believe the mortality has been a little less than 7 per cent. and that includes all cases, some infected and others malignant where I have had to do hysterectomy and so on. But I do not see why the mortality should not be less than that if we can get the cases earlier and treat them under ideal conditions.

DR. GEORGE H. LEE, Galveston, Texas (by invitation).—I want to take this opportunity to express the pleasure and instruction I have gotten from my attendance at this meeting.

The question of Cesarean section is an exceedingly interesting one. I come from the other extreme of the United States and I expect that my position in this matter will be rather unique. I have done Cesarean section a few times, with a maternal recovery of 100 per cent., and a fetal mortality of 50 per cent. But let me explain. I have had two cases of Cesarean section, one for threatened eclampsia in a woman who was carried along for a month or more, and in whose case I felt justified in operating. The mother and child recovered. The other case was a full breech presentation, the cord presenting; the woman was a primipara and the wife of a doctor. The fetal pulse was 130 and she was in the first stage of labor. I advised and offered to do Cesarean section which was accepted after some hesitation and a good deal of consultation. I did a Cesarean section and delivered a child that had a spina bifida, and hydrocephalus 50 per cent. which I did not know. How could I have diagnosed it previous to the operation? The mother recovered.

There are a great many points that occur to me in connection with this matter. One came to me while one of the gentlemen was speaking, of doing a Cesarean section for central implantation of the placenta in placenta previa. One of the dangers in the delivery of cases of placenta previa is hemorrhage after the third stage by reason of the fact that the placenta is implanted in the lower passive zone of the uterus is in a portion of the uterus which does not contract and thus check hemorrhage from placental site. The question with me has always been how are we to guard against a hemorrhage after the child and the placenta have been delivered in these cases in which you do Cesarean section for central implantation of the placenta. I would like to have some expression of opinion or some suggestion along that line.

Dr. John Norval Bell, Detroit.—I think Dr. Brown has made a very pertinent remark in this discussion, and that is, we must educate the general practitioner. We all know the advantages and disadvantages of Cesarean section and what the indications are for that operation. We are specialists, but we know the general practitioner sees these cases first and there is a woeful negligence on the part of the general practitioner.

As far as the mortality of the child is concerned, they do not consider that the child has a right to be born alive and can be born alive with our modern knowledge of this subject. What we should do each and all of us is to read papers on this subject in our local medical societies, read them at the meetings of the general societies, and educate the general practitioner as to the fine points in connection with this subject. I am convinced that they do not appreciate the fact that a great many of these babies that are born mutilated, torn and dead, should and can be born alive.

Dr. William H. Humiston, Cleveland, Ohio.—Just a word or two in reference to the contrast between a clean Cesarean section and the results we see from the high forceps operations. If the mortality was known following the high forceps operation, it would be simply staggering. There is not a month passes, in the hospital with which I am connected that there is not a case brought in, in which high forceps has been used, the child sacrificed, and the woman's soft parts so badly torn that the rectum and the vagina constitute one passage. Often the bladder and urethra are injured, and the woman in a septic condition. I feel that these women should have better obstetric care and advice, and this can be had only through better training in obstetrics in our medical colleges. Many now doing obstetric work do not hesitate on the slightest pretext to attempt high forceps—which is a major operation and requires the greatest skill of any surgical procedure.

Dr. Charles L. Bonifield, Cincinnati.—In order to emphasize one of the points made by the previous speaker, I wish to say that one of the leading obstetricians of Cincinnati told me not long ago that he was called up one night by a general practitioner, a young man of ambition, and nothing else, and asked to assist in doing a Cesarean section. He went to the hospital. The young practitioner apologized for disturbing him at night. The patient was slightly connected with the family by marriage and the young practitioner did not want to assume the responsibility without a little help, and so on. The doctor asked him as to the indications for Cesarean section, and did not get a definite answer, and finally an examination disclosed that the patient was not pregnant at all. (Laughter.)

I think that is a good example of the way some people practice obstetrics at the present time.

Dr. Arthur E. Skeel, Cleveland, Ohio.—There is one suggestion I would like to make in this connection, and that is, the comparison in mortality between craniotomy and Cesarean section in the bad cases is hardly a just one. I should like Dr. Davis at this time, or some other time, to present a little different view of that comparison. He states that the mortality for craniotomy was 15 per cent., and the general mortality rate was 10.7 per cent. for Cesarean section during the entire period. These craniotomies were probably done in the late or bad cases, the infected cases, otherwise craniotomy would not have been done. In the Cesarean section operations the mortality represents not only the bad cases but the good cases. The craniotomies represent in large proportion, cases operated a number of years ago, while the majority of Cesarean sections presented in the same statistics have been done in comparatively recent times. It seems to me, it would be of interest to have a comparison of the Cesareans and craniotomies done in the last five years, showing a comparison of the results as between craniotomies and Cesarean sections done in the same class of cases, that is, the late and infected cases.

Dr. E. Gustav Zinke, Cincinnati.—I feel very keenly the interest the profession takes in this subject; and have contributed my share to the discussions on Cesarean section, for various conditions, during the past fourteen years. I am always very much impressed with what Dr. Davis has to say on this subject. I am also pleased with the clean-cut remarks of Dr. Baldwin, who like

Dr. Davis, is one of the thinking surgeons in whose judgment we may trust.

I will not repeat what has already been said except to emphasize the one condition to which Dr. Baldwin referred, faulty presentations. I am vividly reminded of a case I was called upon to attend in labor about twenty years ago. She was a primipara, handsome, perfectly built and in perfect health throughout her pregnancy. I was never able to hear the fetal heart, nor feel the fetal movements. There was no doubt of her being pregnant. I was certain of a vertex presentation, but the position of it could not be determined. She went into labor and was delivered at her home. Dilatation of the os was very slow; the membranes ruptured spontaneously, but there was no descent. After the os was fully dilated and the head remained at the brim in spite of good and forceful contractions of the uterus, the axis-traction forceps were applied. After protracted and careful traction upon the forceps for fully half an hour I began to realize that I was in the presence of an unknown and, at this time, unrecognizable complication. The pelvis was normal and ample. I determined upon version. Upon the introduction of my hand into the uterus I found the cause—an unyielding head, hand, and foot, presenting themselves at the same time. It was an easy task to turn the child; and, after a great deal of an effort I succeeded in delivering a dead child. The mother died of sepsis one week later. If this patient had been in a hospital, and could have received the after-treatment she required, I am sure she would have lived. A Cesarean section would have saved the child; but there was no indication for this operation prior to the second stage of labor and before the introduction of the hand into the uterus for the purpose of version; and then it was too late to perform this operation.

I am glad that Cesarean section has found a wider field of usefulness. It is my firm belief that, *in certain forms of placenta previa*, Cesarean section is the proper procedure. Not every case of placenta previa is one for Cesarean section; indeed the majority of them may be safely delivered without resort to this operation. Nor does it matter whether we have a case of placenta previa centralis, lateralis or marginalis. Any of them may admit of safe delivery with the use of the tampon, balloon dilatation and version. If the case before us is one on which the hemorrhage can be successfully controlled by tampons or the balloon until complete dilatation has occurred, Cesarean section is not indicated. In cases of a vertex and breech presentation this is frequently possible. But it is almost impossible to control the hemorrhage in an oblique or transverse presentation, because the tampon cannot be placed effectively. Nor is it possible to control the hemorrhage, no matter what the presentation, if the placental implantation is pathologic in character. The justification of Cesarean section in placenta previa resolves itself into this: If the hemorrhage can be successfully controlled at all times, Cesarean section may not be necessary: if it is difficult to control the bleeding, no matter what the implantation of the placenta or the presentation of the child, Cesarean section is justifiable—aye imperative—and will give the most satisfactory result.

Much has been said as to the danger from postpartum hemorrhage from the placental site after Cesarean section for placenta previa. It has been one of the most prominent points urged against Cesarean section in placenta previa. A placenta removed from the lower uterine segment before it is dilated and attenuated by the passing child is not, as experience has shown, attended by serious hemorrhage; but the detachment of a placenta previa following (or preceding) the delivery of a child per vias naturales, is always attended with great loss of blood and many of these poor victims have died of postpartum hemorrhage for lack of sufficient contraction in the overstretched lower segment of the uterus.

You will pardon me if I insist that Cesarean section is rarely, if ever, indicated in cases of puerperal eclampsia. These cases can be very successfully managed medically in the vast majority of instances. I have not as yet encountered a case of puerperal eclampsia in which I believed Cesarean section was justifiable. I have no desire to question the judgment of my friends who differ from me. My own experience with puerperal eclampsia has convinced me that I am right. I simply wish to maintain the position I have taken on this subject.

The high forceps ought to be relegated to the past; not even the skilled, experienced, and well trained obstetrician is justified in their use if his patient is free from sepsis, in aseptic surroundings and if he knows how to make a Cesearan section.

Dr. Davis (closing).—It is very gratifying to me to see such a free and thorough discussion as my paper has brought out and to find that Cesarean section has so large a field. It is impossible for me at this hour to answer the arguments *pro* and *con* that have been made here. I think that there is some danger in the teaching that we should resort to Cesarean section much more frequently than has been done in the past. If that teaching goes out it is liable to be abused. We hear quite frequently, half humorously and half seriously, that the time is coming when every woman will be delivered by Cesarean section. That is a mistake. It is a valuable operative procedure when kept within reasonable limits, and in these neglected cases which depend on a matter of judgment, each should be treated as an individual one and should be managed accordingly. If an obstetricain should do a Cesarean section in a case in which it is not clearly indicated, and the patient should die, it would be unfortunate. But if some other operation is done the mortality is likewise high.

With reference to pubiotomy, I have seen it done (I have not done it myself), and the results to my mind are not alluring.

TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

Meeting of October 1, 1914.

The President, George Erety Shoemaker, M. D., *in the Chair.*

Dr. Michael G. Wohl (by invitation) demonstrated a series of

ECTOPIC PREGNANCIES, DERMOID CYSTS OF THE OVARY, FIBROID TUMORS OF THE UTERUS, OVARIAN CARCINOMA.

Dr. Collin Foulkrod.—It occurs to me that perhaps during the past year our ideas have been revised upon two gynecological points. First, regarding the question of fibromata during pregnancy. We have been doing more sections as the years go by and we have found more fibroid uteri pregnant. My impression is that we have a larger percentage of pregnancies occurring in fibroid uteri than we have thought. We have fibromata of different sizes. In some instances the uterine inertia of pregnancy is due to small multiple fibromata throughout the uterine muscle. In the second place regarding dermoid cysts. These form a peculiar study and many theories are proposed. Within the last two months I saw a case which had been delivered at term with a difficult labor in which the attendant could not understand the cause of the difficulty. The woman developed a temperature in the puerperium. Upon opening the abdomen six weeks after delivery I found a large dermoid cyst of the left ovary and one of the right. Both ovaries were obliterated. The first cyst was the size of a fetal head; the second, of a goose egg. I am inclined to believe that the stimulus of pregnancy applied to a dermoid cyst brings on a condition which is developmental in character. I have in mind three different cases, one after an abortion, in which I took out dermoid ovarian cysts as large as a full grown person's head.

Dr. George W. Outerbridge.—In connection with what Dr. Foulkrod said about pregnancy occurring in the presence of two large dermoid cysts, while those cysts may have been stimulated to development and increase of size during the pregnancy, we must remember that even very large dermoids nearly always show under the microscope a cortex of normal ovarian stroma, and therefore the presence of such tumors, even when bilateral, is not necessarily to be considered a hindrance to pregnancy, even if the dermoids were well developed. In connection with ovarian carcinoma, one point of some clinical importance that has not been touched upon, is the fact that not infrequently bilateral carcinomata that appear at operation to be primary, are really secondary to a small and unsuspected growth in the stomach or some other portion of the upper gastrointestinal tract. Unless this is kept in mind, ovarian tumors which are evidently carcinomatous will be removed, and the upper abdomen, the site of the small and unsuspected primary focus, will be neglected. This has been called to our attention particularly in the last few years. One theory advanced for the frequent involvement of the ovary secondarily to carcinoma in the upper abdominal tract is that stray carcinoma cells get from the original growth into the general peritoneal fluid, and by gravity travel down toward the ovaries, which owing to their lack of smooth endothelial covering and numerous small surface scars resulting from the rupture of follicles, afford a particularly favorable site for their implantation. One specimen which I recently examined shows very beautifully such a beginning invasion directly on the surface of the ovary.

Dr. H. J. Hartz.—The question of the calcification of fibroids is, naturally, a matter of observation of the tumor itself, and depends whether the study is made in the gross specimen or whether the tissue is seen under the microscope. Many fibroids which do not show calcification to the naked eye, do show deposits under the microscope. This occurs more commonly that is supposed. Gross calcific deposits are rather rare. Roughly reviewing 2000 gynecological specimens in the Jefferson Gynecological Laboratory I found gross calcific deposits not very common but frequently they could be seen under the microscope. About a year ago I looked over some 1200 records of specimens coming through the laboratory and estimated that 4 per cent. of these were ectopic gestations. This further corroborates the statement of Dr. Wohl that 4 or 5 per cent. of all operations for gynecological conditions are for ectopic gestation.

Cases diagnosed clinically as multilocular cyst of the ovary, but under the microscope showing many papillary projections, should be diagnosed as papillary cysts of the ovary. Many of the plain cases of multilocular cysts often show under the microscope small projections not visible to the naked eye. Proliferating papillary cysts of the ovary are recognizable under the microscope as such. Many of these cysts that begin to undergo carcinomatous change cannot be recognized by the naked eye. In many solid tumors of the ovary it is difficult to decide whether they originate as such or develop from preexisting papillary or multilocular cysts. With definitely formed areas of papillary cyst formation and distinct medullary deposits of cancerous tissue we may deduce that perhaps they originated from the papillary cyst. In many of these solid tumors we find areas of medullary carcinoma which it is impossible to distinguish from adenocarcinoma. Some of these are simply masses of cells which some are wont to call carcinoma simplex. Among the benign solid tumors of the ovary the fibroma is the most common.

Dr. E. E. Montgomery.—I congratulate the society upon the excellent presentation which Dr. Wohl has made. The subject is a difficult one to discuss, because the manner in which he has put it before us has covered the entire field of gynecology.

In connection with tubal gestation regarding the formation of diverticuli—these may be formed by agglutination of folds of the mucous membrane, forming avenues into which the ovum may enter. Tubal gestation is due oftener to contractions which occur in the muscular coat of the tube as the result of inflammatory changes. The progress of the ovum down the canal is so slow because of such changes that from increased nutrition it becomes too large to pass further and ectopic gestation is the result. I think carcinoma occurs more frequently in the ovary than we realize, and it is only by careful microscopic examination that we are able to exclude it. The finding of patients who have had ovarian tumor removed and in whom macroscopically there was no indication of the disease, but in whom subsequently recurrence follows in the peritoneal cavity is evidence that the disease occurs more frequently than we suppose. Two such instances occur to my mind. One occurred in the practice of a physician at Atlantic City who asked me to see her in consultation. Apparently there was free fluid in the abdominal cavity, resonance changing with change of position. The physician had used a trocar and was much surprised at obtaining no fluid. I told him there was no question about the presence of fluid and that the only way I could explain his failure to obtain it was that it was too thick to pass through. I opened the abdomen a few days later and removed nearly 2 gallons of viscid material. This had been confined within a sac the walls of which were so thin that it was not perceptible in the examination of the patient. Later I was asked by another physician to see a patient with malignant disease in the peritoneum which had penetrated the vaginal canal. Not infrequently the recurrence of malignant disease is secondary to disease above. Often infiltration into the peritoneal cavity will show, apparently, no connection with ovary or tube. One method of diagnosis is examination through the rectum to determine whether there is secondary involvement.

Dr. George Erety Shoemaker, President.—I should like to ask the cause for the removal of the uterus in the case of puncture? Was it septic poisoning or because of extensive injury?

Dr. Wohl (replying to Dr. Shoemaker).—There was hemorrhage. The specimen was sent to me. The case was operated upon by Dr. Barnes.

Dr. F. J. Hartz exhibited and described

A NEW VAGINAL SPECULUM.*

Dr. E. E. Montgomery.—Such a speculum is creditable to the one who devised it and certainly is practicable for making local applications to the inflamed mucous membrane. It is useful also in the application of liquids, sprays, or insufflation to the surface of the vagina. The instrument in its appearance and scheme speaks for itself.

Dr. Edward A. Schumann demonstrated a

SERIES OF GYNECOLOGICAL LESIONS OCCURRING IN WILD ANIMALS.

Dr. George Erety Shoemaker.—I do not feel myself capable of discussing the subject. I wish, however, to express my appreciation of the opportunity Dr. Schumann has given the Society

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*For original article see page 46.

to see these rare conditions which are of the very greatest interest.

DR. SCHUMANN.—The Zoological Garden maintains a very interesting museum which is always open to the medical profession, and where certain forms of diseased tissue may be studied with great benefit. The collection of animal tuberculosis is most unusual, particularly in the group of bone lesions. It is interesting to see Nature's method of healing fractures in quadrupeds and the entire cosmetic repair. The collection is well worth a visit and there is always an attendant who is glad to show physicians through the museum.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OBSTETRICS AND GYNECOLOGY.

Stated Meeting, Held October 27, 1914.

DR. GEORGE W. KOSMAK *in the Chair.*

DR. HENRY DAWSON FURNISS reported

TWO CASES OF BROAD LIGAMENT VARICOCELE.

The first patient was a woman, twenty-five years of age, married five years, and the mother of two children, four and two years old. The first labor was difficult, the perineum having been lacerated and immediately sutured. Menstruation began when the patient was fourteen years of age and had always been regular every four weeks, lasting six or seven days and being large in amount.

Since the birth of her first child, in 1910, she had had a sensation as though the uterus were falling out and there had been much dull, aching pain in the lower abdomen, especially in the right side. In addition she complained of pain over the left iliac crest and left lumbar region. These pains were made worse by working or walking and were relieved by rest in the recumbent position. She also complained of a bearing-down sensation when her bowels moved. She had much indigestion and during the past four years had lost 25 pounds in weight.

Examination showed a small, frail woman with poor abdominal and general musculature. The pelvic examination showed a good perineum, uterus of normal size and in normal position. Straining did not cause it to prolapse at all. On either side there was a suggestion of an elastic resistance that disappeared on pressure. Because of the history, bearing-down pain in the lower abdomen, made worse by exertion and relieved by rest, and the absence of any very definite physical findings, a diagnosis of broad ligament varicocele was made. At operation through a median incision, the ovarian veins on both sides were found to be enlarged to the size of the adult fourth finger, and stood out very prominently. It was noted that there was very little subperitoneal fat anywhere and the veins as well as the uterus were as prominent as in a dissection. Both broad ligaments were a large mass of veins. The ovarian veins on either side were doubly ligated at the pelvic brim and two ligatures were placed around the veins in the base of the broad ligament. A Gilliam operation was done to give the uterus an extra support and to add another help in the prevention of passive congestion.

This patient was operated on August 21, and since that time had been greatly improved, though at times she did have some slight pain in the pelvis. It must be considered that the causative factor in the production of the varicocele had not been removed, namely, lack of fat and of muscular development.

The second patient was a woman, twenty-three years of age, seen September 18, 1914. She had been married three years. Menstruation began at the age of thirteen years, was regular every four weeks, lasting five to seven days and moderate in amount. In March, 1912, she had had a difficult but not an instrumental delivery. She sustained a slight laceration of the perineum at this time. For the past six months she had had constant dull, aching, pain in the lower abdomen, which at times became sharp and cutting. This pain incapacitated her and for three months she had had constant headache. Menstruation for the past six months had been especially painful. All symptoms were worse when she was working and were relieved by rest.

Examination showed a woman of moderate muscular development. There was slight perineal relaxation, more manifest under anesthesia. The uterus was normal in size and position. There was nothing to be palpated in the adnexal regions, though there was an indefinite sense of elastic resistance. Because of the history of constant pelvic discomfort, made worse by work and relieved by rest, together with the negative pelvic findings a diagnosis of pelvic varicocele was made. A median abdominal incision was made. The ovarian veins at the pelvic brim, with the patient in the moderate Trendelenburg position, were the size of an adult forefinger; they were also much enlarged in either broad ligament. The ovarian veins on either side were doubly ligated and a Gilliam suspension operation done with the idea of lessening passive congestion in the pelvis. In addition a perineorrhaphy was done. The patient made an uninterrupted recovery, except that on the ninth and tenth days she had pain in the left renal region with a rise in temperature to 100.8° F. which Dr. Furniss believed was due to renal infection. The day after the operation she volunteered the information that she was free from headache for the first time in three months. To-day her family physician reported that she had been free from pelvic pain since the operation and that only on two or three occasions had she had any headache; on each of these occasions there had been some other than a pelvic cause to account for it.

In both of these cases the diagnosis was made before the operation, and in one it was the only reason for operation. In the other it was the chief reason, though a perineorrhaphy was also done. It was the speaker's belief that many of the patients they saw complaining of great pelvic discomfort, made worse by exertion, and relieved by rest, had pelvic varicocele, and that if this was borne in mind they would be able to diagnose most of them before operation.

COMPLETE REMOVAL OF EARLY CARCINOMA OF THE UTERUS BY EXPLORATORY CURETTAGE. REPORT OF THREE CASES.

DR. L. J. LADINSKI stated that the fact that an early adenocarcinoma of the uterus could be removed completely by curettage had been established as an undoubted scientific fact in 1896 when Gessner read a paper on "The Value and Technic of Exploratory Curettage" and incidentally reported two cases. Since that time cases had been reported by Martin, Ruge, Kiefer, Veit, von Franque, Zweifel, Vassner, Winiwarter, Choudinsky, Ogorek, Graff, Hess, Prym, Stratz, Benthim and Unterberger, in all nineteen cases which he received and to which he had added three of his own.

CASE I.—This case had been cited by Dr. I. C. Rubin as an example of incipient carcinoma of the uterus, in a paper published in the *American Journal of Surgery* in November, 1913. Dr. Ladinski had seen this patient in consultation in April, 1911, because of profuse uterine hemorrhage. She was fifty-one years of age, married twenty-eight years, had had four children. She had been bleeding for a number of months and had been curetted several times, still hemorrhage continued.

On examination the uterus was found large and soft; there seemed to be a hard nodule near the fundus, which could be made out by manual palpation. A preliminary curettage was done for diagnostic purposes. On examination there was found a typical adenomalignum, with early adenocarcinoma. The glands were enormously enlarged and increased in number and the hyperplasia was so marked that the glands lay *dos-a-dos* very little stroma intervening. There was papillary proliferation of the epithelium within the lumena and also an actual increase in the layers of cells, which were atypical in appearance and showed mitosis. A panhysterectomy modified after Wertheim, was done. The uterus on section showed an elongated polyp with its base at the fundus. It showed evidence of curettage. Microscopic examination of this polyp and of the uterine mucosa showed, however, no area of carcinoma. It was evident that all the lesions had been removed by the curet. The bleeding in this case was probably due to the submucous polyp. The incipient cancer was simply grafted upon the polyp.

CASE II.—This patient, forty-seven years of age, had been married twenty-two years, but had never conceived. She had menstruated regularly every four weeks until two years ago, when the menses ceased for a whole year; for the past year she had bled irregularly. Dr. Ladinski said he had seen the patient at his office on October 7, 1913. On examination he found the uterus somewhat larger than was to be expected in a woman who had never conceived, and had begun the menopause two years ago. A small bleeding mucous polyp protruded from the os, which on microscopical examination proved to be benign. As the bleeding continued for five weeks after the removal of the polyp, curettage was advised and performed on November 14, 1913. Dr. Eli Moschocowitz, the pathologist, reported a few days later that the scrapings showed "adenocarcinoma." He advised hysterectomy, but the patient's husband decided to wait a while. The patient then consulted Dr. Coe, who also advised hysterectomy. She then consulted a third surgeon who gave the opinion that she did not require hysterectomy. Two curettages subsequently done by this surgeon showed no signs of cancer on microscopic examination by competent pathologists.

CASE III.—This patient was sixty-three years of age and had been married forty-four years. She had had twelve children, the last twenty-four years ago. She had passed the menopause ten years ago. She consulted Dr. Ladinski for hemorrhages for the past ten weeks. Vaginal examination showed the uterus large and the os patulous. Digital exploration showed a uterine polyp, with the pedicle apparently attached close to the fundus. Under ether anesthesia an attempt was made to excise the polyp but this could not be done because of the extreme friability, and its removal was effected piecemeal by means of the curet. About sixty or seventy irregular masses, about the size of hickory nuts were removed. Microscopical examinations of sections of various masses showed necrotic adenocarcinoma. A panhysterectomy was done. The extirpated uterus showed macroscopically apparently healthy endometrium, and on the posterior wall near the fundus, was still attached a small pedicle, the size of a hazelnut. Microscopical examination of sections of the pedicle as well as of other parts of the uterus showed no traces of adenocarcinoma.

Of these twenty-two cases, all of which were carcinoma of the body of the uterus, the disease was removed *in toto* by the curet. Of these nine surely, and possibly ten, were instances of carcinomatous degeneration of uterine polypi and in the remainder the growth was localized in the mucosa. In nineteen cases extirpation of the uterus was practised, while in four cases the curettage was not followed by radical operation; the patients in whom no extirpation was done remained well for from one to four years.

The method of handling the slides at the Beth Israel Hospital precluded the possibility of confusion. That a carcinomatous growth could be totally removed by the curet when it was limited to a uterine polyp, or when it was confined to the mucosa was proven beyond a doubt by the cases cited. Moreover, Schottlaender held that a young carcinoma could also be removed by the curet even when there was penetration into the muscular wall.

One reason for the scarcity of reports of such cases might be found in the fact that when a subsequent curettage did not confirm the finding of carcinoma at the first curettage, or if the patient continued well for an indefinite time after the curettage had shown adenocarcinoma, the circumstance was attributed to mistaken diagnosis and the reports did not find their way into print. Another reason for the apparent scarcity of reports of these cases was that diagnostic exploratory curettage was not resorted to as often as it was indicated, and that routine microscopical examination of curetings was not practised to the extent that it should be. This was true especially in America for it was inconceivable that of the tremendous number of patients suffering from adenocarcinoma there was not a single record of this nature in this country. The author then emphasized the value of diagnostic curettage in adenocarcinoma of the body of the uterus and said there was no better or safer means at their disposal to detect the disease in its incipiency than exploratory curettage and routine microscopical examination, and that he was heartily in favor of the suggestion of Bonifield, made at the recent meeting of the American Association of Obstetricians and Gynecologists that women should be subjected to prophylactic vaginal examination and curettage as a routine measure.

When clinical symptoms pointed to cancer of the uterus, and exploratory curettage confirmed the diagnosis no one would question the indication for extirpation of the uterus, and there could be no question that to extirpate the uterus, even if a subsequent curettage did not reveal carcinoma, would serve the best interests of the patient.

Could the complete removal of adenocarcinoma by the curet, without extirpation of the uterus, be regarded as an adequately radical operative measure? This question Dr. Ladinski felt sure surgeons would be called upon to answer more frequently in the future than they had in the past. He said he was fully in accord with von Hansemann who maintained that the mere removal of the diseased area did not effect a permanent cure. Even the removal of the diseased area in its incipiency, by the curet, and supplemented by extirpation of the uterus did not protect against a possible recurrence. Ordinary surgical rules demanded that a carcinoma be removed with as wide a field as possible from the disease, and it would be contrary to all surgical rules to leave in a uterus, the seat of carcinoma, even if the curet had entirely removed the diseased portion. The true interests of womankind demanded that they should insist on this in no uncertain terms. In view of the present active and praiseworthy propaganda to familarize the profession and the laity with the extreme importance of the early recognition of cancer of the uterus it could not be too strongly emphasized that extirpation by the curet of a young cancer was no cure, but, on the contrary, a positive indication for the radical operation. As von Hansemann pointed out, "if lay people would be led to believe by the report of these cases that curettage was sufficient to cure a carcinoma of the uterus, they would decline the major operation and great injury would be done to thousands of sufferers from carcinoma uteri. Total extirpation remained the only necessary treatment when exploratory curettage revealed carcinoma."

Dr. Ladinski considered the possibility of a spontaneous cure and that of the latent state of malignancy in these cases and also presented the reports of the pathologists and the specimens of uteri removed.

Dr. Eli Moschcowitz showed lantern slides from the three cases which Dr. Ladinski reported. The curetings from the first case showed typical adenocarcinoma, while sections from the uterine polyp showed simple adenomyoma. The curetings from the second case showed a combination of adeno- and solid carcinoma. In the third, the predominant lesion was an adenocarcinoma with small alveoli, mixed with areas of solid carcinoma. The sections taken from the small pedicle left within the uterus after morcellement of the polyp showed hemorrhagic infiltration (due to the trauma) of a typical nonmalignant adenomyoma. In the second and third case, smooth muscle tissue was easily demonstrable within the stroma. All three specimens revealed undoubted evidences of malignancy. There was reduplication and marked atypicism of the epithelium, irregular alveoli with penetration of the membrana propria, marked irregularity of the nuclei, which were also rich in chromatin and showed many mitotic figures.

At first glance it seems a rather strange phenomenon that a malignant tumor of the uterus could be so completely removable by the curet that the uterus upon subsequent examination showed no evidence of the disease. It must be remembered, however, that many factors come into play that render such a contingency possible. In the first place, adenocarcinoma of the uterus is a growth of relatively slow malignancy. The growth is slow while infiltration and glandular involvement are late phenomena. Furthermore, adenocarcinoma of the uterus can probably be sooner recognized clinically than a malignant tumor in the more enclosed portions of the body, owing to symptoms resulting from encroachment of the narrow uterine canal and early interference with the notoriously sensitive blood supply of the female genital tract.

After all there were numerous parallelisms in clinical records between the phenomenon described by Dr. Ladinski and those occurring in other parts of the body. For instance, Dr. Moschcowitz had seen reports of cure of early carcinoma of the rectum and larynx by simple removal of a cancerous polyp.

These specimens also prove the fallacy of attempting to prognosticate the clinical malignancy of a newgrowth by morphological characteristics alone. Histologically these curetings reveal all the classical criteria of a profoundly malignant growth, including even invasion of the muscular fibers; nevertheless the clinical outcome of these cases show that the condition is eminently curable.

Dr. James Ewing said that Dr. Moschcowitz had covered the ground so well that very little remained to be said from the pathological standpoint. These cases fell into a group of a peculiar type and amenable to an unusual method of treatment. When such a number of cases have been reported as have been reviewed by Dr. Ladinski one cannot doubt the existence of such a type of uterine carcinoma, and they were not all polypoid. Perhaps one could not be positively certain of the significance of the first case but the second and third cases furnished positive evidence that this strange phenomena could occur. The third case was unique in his experience because of the peculiar embryonal origin of the carcinoma.

Dr. Ewing said he wished to emphasize that cancer could not be considered as one disease but as a group of diseases and therefore no blanket rules for treatment could be laid down. The disease was different in different organs and, moreover, it was different in the same organs and hence no blanket rules could be employed in its treatment. There should be a thorough pathological examination in every case in order to help in determining what method of treatment was applicable. For example, in some instances in which papilloma of the tongue was reported the surgeon had removed one-half of the tongue for a benign growth. There were various grades of malignancy that must be dealt with in detail and he therefore emphasized the principle that one should find out with what degree of malignancy he was dealing and apply the treatment accordingly.

Dr. F. M. Jeffries said that it had been his privilege to look over this series of sections and he must say that he had to agree with the findings, and, indeed, any one who saw them must agree that the evidence was as Dr. Ladinski had presented it. Malignancy was shown in the original slides while in the sections that followed from the removed uterus there was no evidence of malignancy. All pathologists who had had any experience had examined specimens and pronounced them carcinoma and then failed to find any carcinoma in the removed uterus, but such instances did not reach publication; frequently the surgeon and the pathologist had the quarrel out between themselves and it stopped there. Dr. Ladinski should dwell on the principle that the nature of the growth should be decided from the curetings, and, though he had shown that cure had taken place after the cureting, there were very few cases that should go without hysterectomy.

Dr. Howard C. Taylor said that the pathological side of the subject had been so completely covered that he would speak only of two or three points on the clinical side.

In regard to a curettage preliminary to an hysterectomy for fibroid tumor of the uterus he did not believe that it was the best course. If a supravaginal hysterectomy is done after the removal of the uterus it can be opened and if anything malignant be found the cervix can then be removed subsequently. If nothing is found to be malignant the cervical canal can be excised with a knife and these two procedures will exclude the possibility of a malignant condition more thoroughly than a preliminary curettage. The point might be raised that if a malignant condition in the fundus of the uterus is discovered by a preliminary curettage a more radical abdominal operation for the removal of the uterus would be done than for a fibroma uteri. Personally he would prefer to do a simple hysterectomy without a previous curettage to a more extensive hysterectomy after the interior of the uterus had been curetted, as he did not believe in cureting a malignant condition for fear of allowing cancer cells to be scattered in the surrounding tissues.

The report of Dr. Ladinski's paper and the cases which he reviewed from the literature are ample evidence that there are some cases of carcinoma of the fundus of the uterus which are cured by the preliminary curettage. There are, however, some sources of error that it would be well to bear in mind. We have come to look upon the pathologist as the court of last resort, to accept his findings as absolute. They are, however, not necessarily correct, and pathologists do not always agree in the diagnosis of malignancy. Dr. Taylor cited a case of a young woman recently married on whom he did a curettage. The curetings were submitted to the hospital pathologist who pronounced the case one of malignant disease of the fundus of the uterus. On account of the importance of the case a second pathologist went over the slide who also said that the diagnosis was one of malignant disease of the uterus. The husband of the patient, not wishing an hysterectomy if it could be avoided asked for a third opinion, and the third pathologist pronounced the case not malignant. No operation other than a curettage was done and the patient has remained well. If it had not been for the opinion of the third pathologist in this case, it would have been proper to include it in the series with Dr. Ladinski's other cases. As a matter of fact, however, it was shown by the opinion of the third pathologist and the subsequent course of the case it was undoubtedly not one of malignant disease but a difference of opinion in regard to malignancy on the part of the pathologists.

Dr. Taylor cited another case in the ward at the Roosevelt Hospital in which a curettage was done and the curetings pronounced to be malignant. In this case at a subsequent operation the uterus was removed but no evidence of malignancy was found in it. While there is a possible error in the diagnosis of this second case, it would seem that it was a case where the malignant condition was entirely removed by the preliminary curettage.

DR. I. C. RUBIN said that Dr. Taylor had touched upon a feature in regard to the difficulty of diagnosis which it might be of advantage to dwell upon, namely *what constitutes a malignant epithelium*?

In certain conditions as in healing erosion of the cervix, an alteration of the morphological character of the epithelium has frequently been observed. The normal layer of single, slender cylindical cells of the cervix glands is often replaced by two or more rows of low cylindrical and sometimes cuboidal cells. Such glands when cut obliquely may give rather confusing pictures, the cells appearing much more irregular. There is, however, no tendency to the formation of giant nuclei, nor of deep chromatin staining, nor of atypical mitosis. In spite of the numerous layers of cells there is a uniformity in the nuclear and protoplasmic staining, in the size of the nuclei which give it móre the appearance of the normal transitional type of epithelium as is seen for example in the mucous lining of the ureter. I have seen similar metaplastic epithelium invading cervical and corporeal polyps and also in the chronic inflammation associating tuberculosis and gonorrhea.

From the morphological viewpoint such epithelium has no significance of malignancy. It is a reparative process. Whether this may be regarded as the so-called precancerous state in the epithelium is a matter of pure hypothesis. When the curetings show in a histological examination such pictures as these, the patients need not be exposed to further operative interference.

Occasionally we do encounter, however, an altered epithelium in the curetted material, the aberration from the normal being more in evidence; we may be in doubt in these cases whether the epithelial changes are those of a malignant growth. The best procedure in these doubtful cases is to keep the patient under careful control and observation and if necessary a second curettage should be done.

There is a third group of cases where it is possible to recognize small cancer foci as such because of the well-marked morphological cell-aberration. There is in such epithelium a conspicuous difference in the size of the individual cells, in their shape, arrangement and chromatin content. There is no evidence of cell-borders, there is clumping of the nuclei-atypical mitosis, giant nuclei and giant cells. When these evidences are present whether or not there is isolation of alveoli or penetration into the depth they are sufficient in themselves to denote cancerous epithelium. Epithelial penetrating sprouts are not absolutely essential evidence of cancer. They do occur in the majority of advanced cancers when ulceration, cornification, hemorrhage are also present.

We have thus far on the histologic side, reliable criteria to guide us in determining whether a certain altered epithelium is benign or malignant and whether the uterus should be removed or not. To Schottlaender more than any other gynecological pathologist belongs the credit for our knowledge of the pathology of cancer of the uterus. His monograph on the subject of cancer of the uterus is probably known to all of you.

Schottlaender has also shown that in 5 per cent. of cancers the growth exhibits the exophytic tendency of propagation, *i.e.*, the cancer grows toward the uterine cavity rather than toward the parenchyma. Such growths are more amenable to radical curettage than the type that penetrate the parenchyma early and hence cause early metastasis. As a rule the growth is both exophytic and endophytic, being more prominently the one than the other.

There is another type of growth which is interesting in connection with the question of radical removal by curettage and that is the so-called "Zuckerguss" or "sugar-coated" variety of cancer described by Schauenstein and others. This type of cancer may involve the entire mucosa of the uterus. It is as though you would pour it over the mucous lining of the uterus. There is slight, if any, penetration of epithelial processes. There is superficial metatasis along the subepithelial lymphatics more or less parallel to the surface epithelium. Such growths are rather uncommon but do occur, and it is conceivable that they would yield to a curettage. If the curetment is vigorous enough there is a good chance of removing the lesion by the curet alone.

As to whether a radical operation should be done in the early cases of cancer of the uterus we have Schottlaender's report of eight very early cases of cancer of the uterus in one of which there was metastasis in the regional lymph nodes. The mortality from operation in these eight cases was nil. The ultimate prognosis as a result of the hysterectomy is certainly improved and at the present time no one will be satisfied with curettage alone as a cure of even the earliest cases of cancer of the uterus.

Dr. H. J. Boldt said that the cases reported by Dr. Ladinski were interesting, but there was only one case, the second case reported, that offered anything not heretofore known. All other cases bore no analogy to his case No. 2. That was the case that was reported by him in the January meeting, and was the only instance that was unusual and not intelligible to him. Dr. Boldt said he had studied carefully every case of cancer reported in the books of Cullen, and of Schottlaender and Kermauner, and nearly all the cases reported by Dr. Ladinski this evening, but not one was found to be analagous. All cases reported by Dr. Ladinski (except his case No. 2) were cancers, cancers in the earliest stage that had not passed the boundaries of the mucosa, or they were polypi. Such instances all admitted as possible of cure by cureting, because there was sufficient proof. The case reported by him was not an early cancer nor a polypus, and to show that the case was unique, so far as he knew —if no "mixup" in the specimens occurred, which Dr. Moschowitz, the pathologist to Beth Israel Hospital negated—he read part of a letter from Dr. Thomas Cullen, of Baltimore.

Baltimore, May 12, 1914.

"My Dear Dr. Boldt:

I am in receipt of your letter of May 7 and also of the slides which you sent me. Those marked 4398 from Beth Israel Hospital show adenocarcinoma of the typical glandular type and also areas where the cells have proliferated to such an extent as to produce solid nests or areas with blood-vessels in the center. This picture of typical glandular type is so frequently seen in the same case that I invariably speak of it as simple adenocarcinoma of the body to avoid confusion. There is in addition gland hyperplasia, that is, large and small glands with a thickening of the stroma, and in one or two areas beautiful examples of proliferation of the surface epithelium.

Section 7005 shows gland hyperplasia and no evidence of malignancy as far as I can detect.

Section 7006 contains one small area of thickened epithelium and there are a couple of giant cells in the muscle. These giant cells resemble to some extent those found with a recent pregnancy and are in no way indicative of any malignancy.

The four slides marked 1537 contain a few epithelial cells in addition to muscular tissue. There is no evidence in them of any carcinoma whatsoever.

You asked me if it would be possible for the scrapings 4398 and the succeeding ones to come from the same individual. You will note that the slides 4398 show an advanced carcinomatous condition. If such is the case, and there is no doubt about it, then it is absolutely impossible for a curet to remove the entire growth. This is judging from my own experience of over twenty years and from that of those who I have come in contact with. I cannot for a moment see how they are from the same patient. Furthermore, the fact that the patient is perfectly well after seven months seems to clinch the opinion that they are different."

The scrapings of slides 7005, 7006, and 1537 were procured two weeks, respectively three months later than those 4398.

Now these slides were examined by quite a number of authoritative pathologists here and in Europe, among them Wm. H. Welch, Schottlaender, Jonathan Wright, and all express a similar opinion to that of Cullen, except Schottlaender, who adds that he could conceive that the growth might be removed by cureting if very thorough cureting had been done over the particular area where the cancer traversed into the muscle.

Drs. Ewing, Moschcowitz and Rubin have mentioned the points in pathology. I might add that neither in the photomicrograph nor in the lantern slide, the field where the cancer traversed the muscle was shown.

All the pathologists considered it more likely that an accidental mixup had occurred and said how this might occur even with the utmost care to prevent it.

DR. L. J. LADINSKI said that in regard to Dr. Taylor's statement he was also of the same opinion that it was inadvisable to do a preliminary curettage for a fibroid and especially so since having this experience with these cases.

As to the differences in the findings of pathologists, he was not discussing these differences any more than he was discussing the differences of opinions of different diagnosticians; he was presenting scientific facts as reported by men preeminent in gynecology and pathology. He had not reported any case because of a question as to the pathology, but reported merely what was accepted in general by pathologists. The question was what should be done when the diagnosis had been made in regard to the removal of the uterus. It would be a false teaching when they were trying to instruct physicians and the public in regard to the necessity for early diagnosis and treatment in cancer to teach that in cases of this kind there should be procrastination. All the statements made in this report were based on facts.

DR. W. H. W. KNIPE read a paper entitled

THE FREIBURG METHOD OF DÄMMERSCHLAF OR TWILIGHT SLEEP.*

REPORT ON A SERIES OF CASES IN WHICH THE TWILIGHT SLEEP WAS USED.

DR. ROSS MCPHERSON stated that Dr. Harrar and himself had tried this form of amnesia in obstetrical practice and presented the results obtained. He confessed that he had approached this treatment in a spirit of skepticism, due partly to the fact that he had given the method a trial in 1908 without marked success, and partly owing to the published opposition of many well-known obstetricians. They expressed opinions that were apparently based on one of two

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* For original article see page 884, December. 1914.

things; either their ignorance of the manner in which the drug was to be employed, or on the results of the treatment when first tried several years ago when an improper technic was used. It would readily be seen that neither of these facts were entirely warrantable reasons for condemning any scientific investigation.

What they wished to show, if possible, was whether this method provided a safe procedure for both mother and child in a sufficiently large number of cases to make the study of the technic of its use worth while and whether or not by or after effects were developed which would contraindicate its use. The technic which they had used was that of Gauss and Krönig down to the finest possible detail, and as this technic had just been described it was unnecessary to go into it any further.

The cases were in most instances from the wards of the New York Lying-in Hospital, although there were included several private patients. There were 115 cases, all primiparæ. Complete amnesia was secured in seventy-five of these; partial amnesia in eleven, and in twenty-five there were no results. The four remaining were too far advanced in labor to derive any benefit from the drug. In nearly all the seventy-five cases in which amnesia was secured the treatment was started from three to seven hours before the termination of labor. There were no bad results that could be attributed to the use of the drugs as far as mortality was concerned. One mother developed a rapid, weak pulse (140 to 160) for two hours after delivery with slight delirium but soon became normal and showed no ill effects the day following. The case was perfectly successful as far as effacement of memory was concerned. There was no asphyxia attributable to the use of the treatment and no hemorrhage postpartum of moment. The average duration of labor was somewhat shorter than the average duration of labor in cases not receiving the treatment. They had noted in general a more rapid dilatation of the cervix than usual, with somewhat slower second stage than was normally expected. This, however, had given rise to fewer lacerations of the perineum and might be hastened when the delay seemed too long by the use of pituitrin. In the first 100 cases there were seventeen forceps extractions in the scopolamin cases compared with eleven in an untreated 100 cases. Eight of these seventeen operations were for the arrest of the head at the outlet and strong pains and would have been required in any case. Six of the remainder were due to inertia at the outlet and could now be avoided by the use of pituitrin. The involution of the uterus and the puerperium were in all cases uneventful.

In summing up Dr. McPherson said it seemed that in 60 to 70 per cent. of cases they had a very valuable method of abolishing a woman's recollection of pain in labor provided the described technic was carefully carried out, the cases carefully chosen, and the drugs reliable and stable, the last being of great importance. It was not a method which could be employed without considerable study of the technic and patient attention to detail, and was better carried out in a hospital than in a private house, unless the circumstances of the patient warranted the transference of a complete working force to the house. The employment of these drugs in no way lessened the necessity for obstetrical skill, but rather increased it. In short they had here another valuable therapeutic aid for their armamentarium which in indicated cases was of much value, but which was not a panacea for the pains of labor, and had not yet reached the stage of perfection which made childbearing an entirely enjoyable process.

Dr. Abraham J. Rongy believed that one could take an obstetrical case and tell the patient she would go through a painless labor, for it was not a painless labor but an attempt to get the patient into a state of amnesia and this was the guiding point in the Gauss method. The patient might scream out and apparently go through considerable pain and yet never remember it. She did not remember the pain and so was just as well satisfied as though she had never gone through it. In their series of 230 cases, 80 per cent. of the children suffered from slight oligopnea. The first stage of labor was shortened, but the second stage was prolonged. So far as hemorrhage was concerned there did not seem to be any perceptible effect. Amnesia was obtained in about 80 per cent. of the series. As far as analgesia was concerned it had been difficult to measure. The method was more applicable to primiparæ, as in multiparæ the time was usually too short. The second stage of labor was prolonged, the head being delayed at the brim of the pelvis, and in this event they used pituitrin guardedly since a combination of scopolamin and pituitrin was apt to possess dangers for the baby. The delay of the head at the brim of the pelvis was apt to be followed by difficult micturition for a few days.

Dr. Samuel W. Bandler said that before going so far afield in the discussion of this method it would be well to ask themselves the simple question "What do we gain?" It seems that the labor lasted longer with this method than under normal conditions and even though the patient forgets that she has had pains "What have we gained?" In his experience he had never found a woman unwilling to undergo a second childbirth because of the pain experienced in the first. He had had a large experience in the use of pituitrin and used it with few exceptions in the second stage of labor as it lessened the duration of the second stage by about one-half, and he had never seen a case of asphyxiation from pituitrin.

Dr. Bandler said he had used morphine, scopolamin, hyoscine as long ago as eight years. During eight years he had occasionally tried morphine and hyoscine in atony before a forceps operation, but only in a few cases had he used these drugs according to the recent methods, but he believed that morphine, hyoscine and scopolamin inhibited the action of the pituitrin and if one used these drugs the addition of pituitrin did not shorten the second stage of labor.

With the use of pituitrin he now had one forceps case where formerly he had four or five, not only was the duration of the second stage shortened but asphyxiation did not exist. Dr. Bandler felt assured that the oligopnea reported was due to morphine and hyoscine.

Dr. James A. Harrar said that the speakers seemed to be pretty well in accord as to the efficacy of the "Dämmerschlaf" when the technic of Krönig and Gauss was followed in detail. In his experience the general effect on the labor had been a rather more rapid dilatation of the cervix than usual with shortening of the first stage, followed in a certain number of cases with a delay on the perineum. This delay if the fetal heart was carefully watched was in the main beneficial for the mother, resulting in a marked diminution in the number of perineal lacerations. Thirty-seven, including the slightest, in the first hundred primiparæ delivered under the scopolamin semi-narcosis, as against forty-five per hundred, which was the average noted in the Lying-in Hospital records in ordinary primiparous labors. Getting the patient under the influence of the drug must be gradual with the minimal dosage in each case that would produce the desired effect. It should be remembered that we are dealing with a drug that the pharmacologists insist is in no way to be distinguished from hyoscine, the dangers of hyoscine being too well known to require reiteration. Examination of the mother's urine before and after labor had not shown any bad effect upon the kidneys. The involution of the uterus was not hastened in any way, and no reason was found for getting the patients up any earlier than was the custom. Then as to the effect upon the babies, for after all in any confinement the life of the child was one of the chief objects of concern. From his very brief experience with the "Dämmerschlaf," less than 125 cases which he had personally overseen, he was impressed that any harm that came to the child under this treatment conducted strictly according to the technic outlined by the speakers, would be the result not of the scopolamin but of bad obstetrics. Even better obstetrical knowledge and judgment than usual was necessary, and abdominal and vaginal examinations must be carried out as in any labor. Scopolamin anesthesia in childbirth was no magic touchstone whereby the child was surreptitiously detached from the mother. In the enthusiasm over the high percentage of successful amnesias one must not neglect to pay attention to two important and not uncommon difficulties. The first, delay on the perineum, which must be corrected with forceps if necessary as indicated by the condition of the fetal heart. He believed the indiscriminate use of pituitrin for this purpose was to be condemned. Undoubtedly pituitrin was responsible for some stillbirths in cases where scopolamin was not used, and there was no reason to believe it could have any better effect in these scopolamin patients. The babies that were born with more or less asphyxia, 8 per cent., were chiefly those in which there had been a delay on the perineum. This percentage, however, was not above the average observed in primiparous labors, and these babies all promptly revived. The percentage of stillbirths was the same, two to the hundred. The second disadvantage he had noted was the frequent development of more or less delirium as the head distended the vulva. This was probably due in part to the commotion of moving the patient to the delivery table at this time, and partly to the increased pain. It was this restlessness that would make him hesitate to undertake the method in private houses unless there was an abundance of trained assistance. It became otherwise very difficult to maintain an aseptic technic. There were certain limitations to the extensive use of the method in the hospital. It was a suitable treatment in less than 10 per cent. of the admissions. The time and attention required might be said to have been the chief obstacle to a wider use. Many women came in too far advanced in the second stage to begin the scopolamin. Primary inertia he considered an absolute contraindication to the treatment. Its use was also to be avoided in cases in which operative maneuvers were anticipated, in ante-partum bleeding, and in bad lung and kidney cases.

Dr. Robert L. Dickinson of Brooklyn spoke of the difficulty of getting at the root of things in the Freiburg clinic; whatever one found out he had to dig for himself. The method must have something in its favor for Krönig was one of the most earnest of men; he had been offered a professorship at Berlin which he refused because he said he did not wish to degenerate into a money maker. It seemed that with the "twilight sleep" the patient was under the influence of belladonna poisoning; she was excessively thirsty and belladonna crazy just when you wanted her most quiet. One could not sew up a perineum with the patient in such a restless condition.

Dr. Dickinson related the case of a woman who had had two previous confinements and did well but for the third demanded the twilight sleep but did not wish to enter the hospital. A man was sent from the maternity hospital who was acquainted with the administration of the "twilight sleep" to attend the woman. The baby was born asphyxiated and could not be resuscitated and now the parents were bringing a law suit. It was evident that the method had a place but the patient should be in a hospital, for few patients could pay for the skill and time required and the necessary watchfulness. The time was coming when this method would be applied to every primiparæ. It was difficult to conduct this treatment properly and at present it belonged entirely to the skilled obstetrician and not to the public.

Dr. George P. Shears had recently had a few cases at the City Hospital. This country had done its part in the effort to eliminate pain; it was at the Massachusetts General Hospital that the first operation was done under anesthesia, but with the "twilight sleep" one sometimes wondered if the game was worth the candle. There was no sensation that faded so quickly from the mind as that of the pangs of childbirth, and as was well known to the obstetrician there was none which excited such fear. The paper was so moderate, so clear, and so logical that the speaker felt that he had learned something. In twelve or fifteen cases that had come under his observation the effect on the mother was wonderful; there was no subsequent hemorrhage, no relaxation, and the mothers recovered quickly; but the subject had its dark side, and that was the danger to the baby. There were several factors involved in this effect, the morphine, hyoscine, chloroform, or ether in case it became necessary to apply forceps, and to tell any one that the baby was better under such conditions was to put too much strain on the imagination. When the second stage of labor was prolonged there was increased danger. The fetus got less blood, and to say that a baby got along as well or better under such conditions was absurd, and no one could seriously believe it. He had witnessed the death of one baby and no one had paid any attention to the fetal heart in this instance; it went to 100 and below. He did a forceps operation as rapidly as possible (in two and one-half to three minutes). The head was low and he attributed the death to the treatment and he did not believe this danger to the fetus could be eliminated. The object of the pregnancy and of the labor was the baby, and the mother was willing to suffer almost anything for the baby and it must be alive.

Dr. Samuel J. Druskin said that we should not reject a method because it did not originate in this country. To him it was of lesser importance whether twilight anesthesia or chloroform anesthesia were "Made in America" or "Made in Germany" than whether one or the other method served a useful purpose or not. Dr. Bandler states the question when he asks "What is to be gained by this method?" In reply Dr. Druskin wishes to refer to the work of Dr. Crile, a leader among American surgeons. Crile has demonstrated conclusively that violence, insomnia, and anxiety are the three great factors in the production of shock. What this method did is to eliminate insomnia and anxiety, not to mention the fact that the mother had escaped a disagreeable experience, had had it wiped out of her memory. The statement that morphine and narcophin inhibit the action of pituitary extract on the uterus is true to a limited degree, but the inference that the extract is useless in those cases does not follow. The extract causes sufficient contraction of the uterus even in "twilight" cases to cause expulsion of the child. You may also get assistance from the mother herself by urging her to bear down. Of the inconveniences resulting from the treatment and not mentioned to-night are the necessity to catheterize these patients more often than the ordinary cases. They have used the treatment in all sorts of cases: in cardiac cases; in kidney cases, including eclampsia; in malpresentations and malposition, including breech presentation, with good results. Dr. Druskin prefers narcophin to morphine for at least one reason of the many that could be given: narcophin is less of a respiratory depressant.

Dr. Samuel J. Scadron said that he had under observation about 250 cases in which the "twilight sleep" had been used and had seen no untoward effects on the mother or child from the use of scopolamin. As regards the use of morphine or narcophin he observed equally good results with both alkaloids. In most all the cases only one dose of narcophin (gr. 1/2) or morphine muriate (gr. 1/6) was used.

He believes that scopolamin has no accumulative action. It appears in the urine from fifteen to twenty minutes after the first hypodermic injection. By the time the third dose was administered the first had lost its effect and was out of the system. He had one case twenty-eight hours in twilight and the patient received nineteen injections of scopolamin and one dose of narcophin; this was a very successful case as the mother had complete amnesia and the child cried immediately after the delivery.

The question of pituitrin had been dwelt upon. However, one cannot help to emphasize its dangers in obstetrics, especially in combination with scopolamin and morphine. In one series 15.2 per cent. of the infants were born with oligopnea and he believed this was due to the pituitrin. If the pituitrin was given simultaneously with the scopolamin it had an effect on the infant, it was cyanotic and the respirations slightly delayed; but if it was administered one-half hour after the scopolamin no bad effect was observed.

Some of the patients receiving this treatment were permitted out of bed forty-eight hours after delivery and were discharged on the fifth day from the hospital. Subsequent examinations showed the uterus well involuted, in normal position and the general condition of the patient very good. In fact these women were in better condition than those who did not receive the twilight treatment and were in bed for ten days. He attributes this to the fact that twilight patients show no signs of exhaustion after labor and receive daily exercises as described by the reader of the paper.

Dr. Ephraim K. Browd said that he had had a large experience with pituitrin in dystocia and was of the opinion that if the cervix was imperfectly dilated its use was contraindicated and its effect upon the child was dangerous. The employment of pituitrin was limited to the second stage of labor and dystocia; its effect was that of an oxytocic, while the action of scopolamin was that of a hypnotic and might be used from the beginning of labor; the action and employment of both drugs were distinctly different. Scopolamin would prove useful in cases of cardiac, pulmonary or renal disease or in cases of extreme anemia or neurasthenia, or in cases in which anesthetics could not be used. They had not been told how far this method was applicable in cases of malpresentations or malpositions. The asphyxiation of the child, he believed, was due more to the child's head resting on the perineum than to the effect of the scopolamin. All these questions would have to be worked out and the twilight sleep should be given a fair trial.

Dr. Alfred M. Hellman said he had gone to Freiburg rather prejudiced against the "twilight sleep," but that he was rapidly converted and had become very enthusiastic, and the enthusiasm of the women who had received the treatment would rapidly convert one to champion its use. Many of the women asserted that labor was painless, at least they had no memory of the pain; in some of these cases those present thought there had been pain but the women had absolutely no memory of it. There were two or three points, Dr. Hellman said, that impressed him as important, and one was the great rapidity of recuperation in the women receiving this treatment. They did not suffer from the great exhaustion as did those who have been through a long labor and the uterus returned to normal much earlier. It was claimed by many that the danger to the child was greater in "twilight sleep" but the babies can all be revived and Krönig believes that the delayed breathing was often valuable because it prevented breathing before birth of the head.

Dr. W. H. W. Knipe, in closing the discussion, said that if the method was properly applied there was practically no asphyxia in the infants. At first about 25 per cent. had oligopnea, but this had been reduced and at present there were practically none if the method of Gauss was followed carefully, or if oligopnea did occur it was not severe.

In regard to the use of pituitrin he agreed with the men who used it with extreme caution.

Dr. Knipe said he could not understand the statement that the Gauss method prolonged the second stage of labor by one-half. In their series of cases the total duration of labor was reduced. If those who had said that the mothers did not gain much and that the babies were endangered could hear the women who had received this treatment enthuse over it they would not ask what was to be gained.

Someone had spoken of the delirium; this was very little and might be due to moving the patient. It was not a good practice to move the patient to the operating-table, but much better to leave her in bed. The severe thirst and restlessness had been referred to; with proper dosage these symptoms were reduced to a minimum. As to the lawsuit, that had to be taken into consideration in any case whether the twilight sleep was used or not.

As to the narcophin, he had asked about it at Freiburg, where, as Dr. Dickinson had said, one had to search out things for oneself, and he learned that they were just testing it on fourth-class patients and it had not been adopted as a routine method.

As to the after-care of the patients who had received the twilight sleep, that was different from the usual after-care, in that patients were out of bed earlier. He had not observed any special difference in regard to involution. This had taken place rapidly in their cases but he attributed it to the systematic exercises employed.

Dr. Knipe said they had used the twilight sleep in patients having cardiac lesions, in one case having a myocardial lesion, but he had not used it where there was lack of compensation.

Dr. Ross McPherson, in closing the discussion, said that in regard to what Dr. Bandler had said as to the time of labor, in their series of cases the total duration of labor was two hours shorter on an average when the scopolamin was used than it was in a like number of cases in which no such drugs were used. So it seemed that instead of a prolongation of labor the use of scopolamin actually shortened the total duration of labor. As to the statement that he did not hear of patients not wishing to have a second child because of the pain endured during childbirth, every one who had an experience of any extent learned that quite the contrary was the fact, that many women came asking for abortions because they could not again endure the awful suffering that they had experienced in the first labor. One had but to see these patients who had experienced the "twilight sleep" to hear them and their husbands express their gratification, to realize what this meant to all concerned.

As to the comparative value of narcophin and morphine, he thought that the latter possessed rather the advantage and it was easier to obtain. There was one point mentioned about which he disagreed and that was early rising after childbirth. He felt convinced that early rising tended to subinvolution; and these were the patients who came back later with gynecological troubles. The patient should remain in bed until involution was complete. As to the effect of the "twilight sleep" on involution, he could not say that it shortened the period of involution, but it certainly did not lengthen it. He did not use exercises during the puerperium to the extent that Dr. Knipe had indicated.

REVIEWS.

II. CHORIOEPITELIOMA. By ERNESTO PESTALOSSA, Professor of Obstetrics and Gynecology of the University of Rome. Atti della Societa Italiana di Ostetricia e Ginecologia, volume. xviii, *a*, 1913, 174 pages and 6 tables of illustrations.

This monograph contains a most complete review of the literature and a careful detailed account of all the questions connected with the subject, besides the author's invaluable contribution and impulse given to the study of this new chapter of gynecological pathology. Undoubtedly Pestalozza has been one of the pioneers in working out this condition, as he was the first to give a complete outline of the clinical and anatomical picture of the disease. This fact seems to be not fully and universally recognized and that is why he opens his work with a review of the historical data concerning the origin of the chorioepithelioma in the literature. Excluding the first publications of Sänger (1888) and that of Pfeifer (1890), mere reports unsubstantiated by detailed clinical and anatomical findings, Pestalozza in his article (*Contributo allo studio dei sarcomi dell' utero*, Morgagni, 1891) is the first who described a tumor which justified the possibility that a disease essentially fetal could be transplanted in the mother; that a special formative activity of the wall of the villus should be considered as a predisposing factor in the genesis of a similar tumor; that the effusion occurred through the veins and the metastatic nodules showed the structural characters of the villus. Upon these historical data accepted by Sänger and Marchand, the author bases his claim of having been the first to give an accurate description of the disease and to recognize the part played by the villus, although he failed to conceive the pathogenesis, which was later brought out by Marchand (1895).

The anatomical side is amply discussed. Special attention is devoted to the principles which govern the origin, constituents, diffusion and retrogression of each focus. The starting of the tumor in the blood-vessels, the metastases through the same, modalities differentiating this from other tumors; the arrangement of the two varieties of elements (cytotrophoblast and plasmoditrophoblast), grouped most of the time as the earliest trophoblast described by Teacher and Bryce, the lacunar appearance of the plasmoditrophoblast, lacunæ containing blood and interpreted as true representatives of blood-vessels for the trophic changes, are all questions intensively treated.

In interpreting the retrogressive changes of some chorioepitheliomatous nodules; in considering the chorioepithelioma as not a true tumor, but as a simple hyperplasia of the fetal chorion, a homogeneous but hetero-individual tissue transplanted in the mother (hyperblastosis of Adami); and in explaining the vaginal metastases as effects of a retrograde embolism, most of the conceptions of Pestalozza deserve the credit of being original.

Although he maintains that the clinical picture has not substantially changed since his first classical description of seventeen successive personal cases, undoubtedly Pestalozza has added to the previous cases such wealth of observations as to render that picture complete in every detail. Basing his opinion upon anatomical and clinical considerations, he strenuously opposes any attempt to separate etiologically mole and chorioepithelioma. It is really of considerable interest to follow the series of arguments he brings up against the recent views of Poso on the relations of the two conditions. This last author in two important contributions to the subject has tried to demonstrate that many cases reported as chorioepithelioma were nothing else but *mole destruens*. Pestalozza flatly contradicts such statements, demonstrating on the one hand the anatomical and clinical differences of the two diseases and on the other clearly showing the evolution from mole to chorioepithelioma.

Although warning against too great optimism in regard to spontaneous cure and having found Fichera's treatment negative in a case too advanced for operative interference, the author thinks it is best to operate whenever the microscopical diagnosis has been made, the disease is not too far advanced and the conditions of the patient favorable at the operation. The author presents the following conclusions: The history of the chorioepithelioma is not exact in many particulars. Chorioepithelioma is a neoplasm derived from an autonomous development of the epithelial elements of the chorion in the maternal vessels. The structure in the early nodes of chorioepithelioma can be reduced to a typical picture, represented by a central formation (endovascular) and a peripheral zone of infiltration (perivascular). The distinction in typical and atypical chorioepithelioma refers to the central formation and to the peripheral zone. The central part is constituted by groups of cells surrounded by a thick syncytial edge. Vacuoles forming a definite system of spaces in which the blood circulates are characteristic of the syncytium. The peripheral zone is mainly constituted of syncytial elements, which invade the surrounding tissues, destroying especially the muscular fibers and the walls of the vessels. The chorioepitheliomatous node has a fatal tendency to necrosis, which begins from the central cells, successively passes to the syncytium and at last to the peripheral zone. This tendency to necrosis is identical with the physiological one of the epithelial elements of the chorion, which end their short life by necrosis of coagulation. The occurrence of such necrosis explains the possibility of a spontaneous regression in the node and the theoretical conception of a spontaneous cure of the disease, which, however, has been observed in a very limited number of cases. This tumor in its origin, manner of development, evolution and metastases, is absolutely different from any other and deserves a separate place in pathology, demonstrating the possibility of a homogeneous transplantation from the fetus in the mother, exclusively through the blood-vessels. The possibility of such transplantation is specific only in respect to the epithelium of the chorion, which has retained or reacquired the earliest embryonal characters; in fact this is nothing but a transplantation of trophoblast from the ovum in the mother. The property of retaining or regaining such characters is probably due to pathological conditions of the chorion or to peculiarities of the maternal organism (constitution of the blood). Chorioepithelioma has a very definite symptomatology, which described in its details since 1891, stands as the most important and least deceiving basis for the diagnosis. Chorioepithelioma usually follows a preceding pregnancy; in one-half of the cases it is secondary to a mole; in the other half it is secondary to pregnancy at term or to abortion, very rarely occurs during pregnancy. The attempt to separate from the etiological point of view, the chorioepithelioma from the mole has no serious foundation; statistical data and correct examination of each case are sufficient reasons for continuing to consider the mole as a strong predisposing factor to the development of chorioepithelioma. The destruens mole has a special importance. Not every mole is followed by chorioepithelioma, but its occurrence in 20 per cent. of the cases should be considered as important. When the chorioepithelioma occurs after pregnancy, probably the ovum is partially molar but not necessarily so. The chorionic elements accidentally brought into the uterine veins may assume an autonomous development after the expulsion of the fetus, under a special stimulus, probably represented by particular conditions of the maternal blood. The prognosis is always bad and the cases following mole should not be considered benign; the mortality of these last cases is as high as 40 per cent. and, if the prognosis of the operations is better the fact is due to the earlier diagnosis. The diagnosis ought to be based on the microscopical examination of the available tissues and on the clinical symptoms, which still deserve the greatest consideration. The treatment must be surgical whenever the operation is possible, with the object of putting the patient in such a condition as to be able to fight the neoplasm.

In the second part of the monograph, the author, to complete his work, gives a long and carefully detailed statistical report of all the available material collected from the literature from 1893 to 1913. He separates the cases into four series:

1. *Ectopic Chorioepithelioma.*—In these cases the tumor develops in any organ, leaving the uterus free. Of the 48 cases reported, the site of development is known in 47. Vagina alone or associated with other organs, 27 times, 20 in the lungs, 14 in the liver, 9 in the brain. Pregnancy has figured in 43 of these cases in the following forms: In 20 cases as hydatidiform mole; in 14 as confinement at term, in 19 as abortion. In 19 of these cases no operation; 19 deaths. Of the 25 cases reported, 13 were cured.

2. *Cases following Pregnancy at Term*, 47.—In 4 cases, result unknown. Of the other 43, 11 were not operated, and all died; 32 were operated upon; of these 13 were cured, although for some the time is still too short to consider them definitely cured: 19 died, mortality 59 per cent.

3. *Cases following Mole from* 1908 *to* 1913.—No. 110, not operated 29, all died. Operated upon, 78; of these 19 died: mortality 24 per cent. Finally the statistical report which the author gives of his own 17 cases is very complete in every detail and gives considerable weight to the conclusions in regard to treatment:

(*a*) It is absolutely necessary to carefully watch for months and years every patient who has had a mole.

(*b*) Early surgical intervention is indicated, when after a pregnancy, to the suspicious clinical symptoms of a developing chorioepithelioma are added the destructive action of chorionic elements upon the myometrium, revealed by the microscope.

A REFERENCE HANDBOOK OF THE MEDICAL SCIENCES; Embracing the entire range of Scientific and Practical Medicine and Allied Science. By various writers. Third Edition, Completely Revised and Rewritten. Edited by Thomas Lathrop Stedman, A. M., M. D. Complete in eight imperial quarto volumes. Volume iv, 925 double column pages, illustrated by 973 engravings and 5 full-page plates in colors. Wm. Wood & Co., New York.

The present volume contains a large number of references to both gynecology and obstetrics and constitutes a most satisfactory reference handbook for the practitioner, whether general or special. The subjects treated in previous volumes have been entirely rewritten in order to bring them up to date and a large number of additional topics have been included. The book is very satisfactorily illustrated and as the subjects are arranged in alphabetical order, an index is unnecessary. Numerous cross-sections are inserted. The biographical articles, especially of American medical men, constitute an important feature of the work. In many instances terms are briefly defined and a reference made to another article in which they are treated more exhaustively. A work of this kind undoubtedly entails an enormous amount of labor and personal attention and Dr. Stedman, the editor, must be felicitated for the successful result which he has presented to the profession in the form of a compact, yet complete reference handbook.

ZUR PROPHYLAXE DES WOCHENBETTFIEBERS, ZUGLEICH EIN BEITRAG ZUR BAKTERIOLOGIE DER SCHEIDE SCHWANGERER. By Dr. Bernhard Schweitzer. Price 4 marks. S. Hirzel, Leipzig, 1913.

This monograph is divided into two parts, the first of which deals with puerperal infection by endogenous organisms and its prophylaxis by lactic acid douches during pregnancy. The second part discusses vaginal bacilli and the presence of lactic bacteria in the vagina of pregnant women. In puerperal infection with vaginal bacteria, increased consideration has been given during recent years because notwithstanding the most careful avoidance of infection from without, a considerable number of cases occur in which severe infection results where no examination or operative manipulations have been indulged in. Vaginal disinfection has been employed in previous years only to be given up again because of the assumption that natural protective power existed in the vagina. In order not to interfere with such physiological processes an indifferent material for douching purposes has been sought and among the many tried, lactic acid seems to fulfill the desired indications. The author presents the results of his personal experiments with douches of a 5 per cent. solution of lactic acid in boiled water in which a distinct reduction in the bacterial flora of the vagina could be demonstrated. The author showed in cases personally observed that in only 90 per cent. of the same, pathological secretions were completely changed and in those containing streptococci it was possible to eliminate the same in 89 per cent. of the cases. The clinical results were likewise favorable, the morbidity among pregnant women who originally presented a pathological secretion was reduced to 7 per cen., at number approximately the same as in those who originally had no abnormal secretion. The effect of lactic acid is evidently intensive and permanent and constitutes an indifferent solution which restores the vaginal secretions to their normal prophylactic property. Douches with this substance eliminate the harmful bacteria, preserve those that are useful and diminish the chances of the penetration of fresh germs. Other methods, especially strong antiseptics or concentrated solutions of lactic acid, exert a particularly harmful effect. The monograph in compact form affords a very important contribution to the pathology of the puerperium.

HANDBOOK OF PHARMACOLOGY. BY C. W. GREEN. William Wood & Co., New York, 1914.

The author thinks that the time has arrived when the demarcation line should be more sharply drawn between those courses presenting to the medical student the scientific principles underlying the action of medicinal agencies and that phase of the student's training which deals with the practical use of drugs in the alleviation of diseases. In other words, he believes that there should be a sharp line of differentiation between pharmacology and therapeutics. Pharmacology is defined as the science which treats of the changes in the physiological actions of normal living organisms induced by chemical or physicochemical agencies. Therapeutics is applied only to that phase of the subject which deals with the reaction of the diseased body to drugs and drug agencies.

In his handbook the author has limited himself to pharmacology. Whether such a step is wise or not is questionable. Most students find pharmacology a study which is extremely tedious, because it is frequently presented as a group of facts more or less isolated, which must be learned by sheer force of memory. It has therefore seemed wiser to the reviewer to point out in discussing the pharmacology of a drug the therapeutic applications which may be deduced from the drug's action. It is, of course, to be remembered that such deductic therapeutics is subject to more or less danger, inasmuch as the diseased body may react in a manner not identical with normal living tissues.

Nevertheless, Professor Greene's book leaves one with a rather unsatisfactory impression—a large mass of facts which are apparently of no practical importance. The fact that the author has attempted to crowd into 380 pages all that is known concerning drug action has made it necessary for him to omit many important drugs and to describe others in a very general way. For example, the only hypnotic which he mentions is chloral hydrate, and the details of action of this hypnotic are described in about two pages.

In the text practically no doses are given. At the end of the book is a dose table, to which the student may or may not refer. The more important drugs are described in a very systematic manner. Thus, there is an introduction dealing with the history and chemistry of the drug; then follows an outline of the pharmacologic action. The details of the action are taken up in a separate division, and, finally, there is a condensed summary of the more important changes induced by the drug.

The illustrations are excellent, and have been taken with a free hand from the literature. Many of them, however, serve to illustrate points of practically no pharmacologic importance.

Like most books published in America the volume is printed on thick paper and is heavy and tiresome to handle.

THE IRON CONTENT OF THE BLOOD IN GYNECOLOGICAL AND OBSTETRICAL PATIENTS.

Maier (*Zeitschr. f. Geb. u. Gynäk.*, Bd. lxxvi, Ht. 1) claims that as the result of a marked diminution in the iron content of the maternal blood, the growth of the child is interfered with and it may possibly perish *in utero* and although the exact import of the iron in the blood is not known it is undoubtedly true that a definite minimum quantity must be present in the animal body in order to prevent death. Although this is not likely to result in an adult, because the iron with which the body was originally provided before birth, never leaves the same but is always replaced. On the other hand if the fetus does not obtain this necessary amount, the organs are not developed in a normal manner and this applied particularly to those concerned with the formation of blood. If they are incapable of carrying out their physiological function the death of the fetus soon follows. He bases this conclusion on the fact that his observations in a series of pregnant and non-pregnant women have shown that the iron content during pregnancy is reduced on an average about 20 per cent. On the other hand, examination of the blood from the umbilical cord show that the iron content of the umbilical blood increased about 25 per cent. above that of the latter.

EDITORIAL.

AN OBSTETRICAL PROCEDURE ON TRIAL.

No development in obstetrics during recent years has attracted attention among the members of the medical profession, and the public, as the procedure commonly designated as "Twilight Sleep," or by its German equivalent, "Dämmerschlaf." The desire to alleviate the pangs of childbirth is a humane and justifiable one. Whether to accomplish this by a better preparation of the mother for her supreme function in life, or by means directed to the immediate alleviation of the difficulty during labor, is still an undecided question. To the impartial observer it must be apparent that the average woman of the present generation in what may be called the better walks of life, has less difficulty in most instances in delivering herself in a normal manner than was the case during the period of our mothers and grandmothers. This has undoubtedly been brought about by better hygienic conditions for our growing girls, including proper exercise and out-door life. A great many women, however, suffer considerably during the process, but, strange to say, the suffering in an ordinary, otherwise uncomplicated case of labor is of such a character that it apparently leaves very little lasting impression on the mind of a normal woman. It may be safely stated as a matter of fact that at the present time most women do not regard with dread their oncoming confinement. Stories of difficult labors, like other disagreeable experiences, are very apt to be talked over among a limited circle of women and being duly exaggerated in the telling, such isolated cases are frequently accepted as standards by women who are of a nervous temperament or of an unstable mental equilibrium.

Although parturition should constitute a perfectly physiological event, many factors both in the individual and her environment have contributed to make the process of pathological significance in many cases. Notwithstanding this, a large proportion of women under skillful care and supervision manage to go through their labor and get up in a reasonable time without injury to their mind or body. The period of preparation for labor as it involves the organs immediately concerned in this process, is a gradual one and where the physiological development has proceeded normally in the individual case the final delivery is usually free from burdensome accompaniments. An active labor consists of both involuntary and voluntary phenomena, each of which is active in its proper time and sphere and one set is dependent on the other. During the so-called first stage of labor the process may be summed up as one of preparation and propulsion. In order that propulsion may proceed satisfactorily, dilatation of the lower uterine segment and the vaginal canal is essential. This is the result of the involuntary but coordinate action of the uterine muscle. Following this comes the stage in which propulsion is accompanied by expulsion, the result not only of involuntary but likewise of voluntary activity on the part of the mother. Therefore in discussing the value of the proposed procedure, the question resolves itself into what interference with the normal processes of labor results from its application, and whether any real necessity exists for its routine employment. The most enthusiastic advocates of the method of scopolamin-morphin anesthesia admit that although the first stage of labor is favored, or at least not interfered with by the procedure, that the second stage, on the other hand, is very apt to be prolonged. It is during this time that the greatest danger to the child may result. It is claimed that the voluntary expulsive efforts on the part of the mother are not interfered with by this form of narcosis but that the woman is able to bring into play her accessory muscles of parturition without being aware of the fact. Is this contention borne out by the statistics which show that the prolongation of the second stage already referred to necessitates in many instances the application of forceps for the purpose of terminating labor? Admitting all the favorable things which have been said in regard to "twilight sleep," are the results sufficiently convincing to permit of a general adoption of this procedure? Those who have given the method a most careful study are of the unanimous opinion that individualization and the conduct of the case in a hospital are requisites to its proper and successful employment. This at once limits its application. Nevertheless many will attempt it under surroundings which are not favorable and if the popular clamor leads to its more extended application by the profession at large, we will soon hear of direful consequences. In American medical literature a comparatively small series of observations have been reported and these only within the past few months. In Germany the publication of Krönig and Gauss have referred to a much more extended series of cases. Unfortunately, however, the brilliant results claimed by European observers have apparently not been duplicated in this country by careful students of the procedure. The first flush of success in its employment seems to have been succeeded in the minds of many by a more conservative attitude toward the method and it is doubtful whether in this country even those who are most enthusiastic will permit their enthusiasm to range as widely as that of our European colleagues.

It is sometimes claimed that the necessity for general narcosis for operative procedures is analogous to this device in labor. Here, however, our main indications for the narcosis, or anesthesia, is not only to avoid pain and shock but also to shunt out the uncontrollable efforts of the voluntary muscles of the body to overcome the operative insult. In labor the status is entirely different. We are dealing with the consummation of the final stage of the act of parturition, for which, under ordinary conditions, there should be no more need of narcosis than would be required for the act of defecation. Admitting, however, that most labors verge on the pathological and may require some degree of narcosis either to alleviate the pain or to favor the period of dilatation, have we not on hand remedies amply tried which will aid us in such cases? Is it necessary to resort to a drug or a combination of drugs, which have not been satisfactorily subjected to analytical tests and animal experiments and toward which patients very frequently manifest previously unknown or unsuspected idiosyncrasies? Are the advantages gained from the procedure of "twilight" of sufficient extent and importance to overbalance the disadvantages which even the advocates of the method are compelled to admit. Undoubtedly a large percentage of women thus treated deliver themselves satisfactorily of nonasphyxiated babies, but aside from the amnesia, would not these same individuals have done equally well without a narcosis wrought with some degree of uncertainty and danger? On the other hand, can we disregard the warning sounded that in many women the second stage under "twilight" is unduly prolonged, that forceps deliveries are often necessary and that a certain number of babies are asphyxiated? Is this proposition in agreement with modern obstetric tendencies which aim to make the act of parturition as natural and as free from artificial aids as possible? Are we not playing with fire in allowing a more or less superficial knowledge of this procedure to be spread broadcast among the profession and laity? Is a propaganda of this kind among women not likely to engender an hysterical and unwarranted fear of the highest function of their lives? Is it fair to womankind for reputable physicians, and here no reference to the ethical aspects of the case is intended, to urge upon the sex in the public press a demand for such a procedure in order to hasten its adoption and to denounce the objectors of their rose-colored propaganda with the statement that they are merely ignorant concerning the method? Thus far the daily press has been the forum for the more or less one-sided discussion by the advocates of "twilight sleep" and we have heard little by way of objection for the honest objector hesitates to be subjected to ridicule because he has failed to become convinced of the value or necessity of the procedure.

We do not wish to condemn "twilight sleep" nor to detract from the honest claims made by those who state that they have tried out the method. The professional mind should be open to receive from legitimate sources any information which will tend to relieve human suffering. It should be free from prejudice, free from the desire of personal gain in judging the value of a new procedure, ready to discuss in a frank and open manner the *pro* and *con* of the question, to employ the forum of personal interview, the Society meeting and the medical press, and not the medium of the popular press and the department store. If medical opinion can be guided by an impartial study and trial of this procedure, the latter will not lack deserving attention, but the senseless reiteration of its wonders by writers and speakers, both lay and professional, such as have been published within recent months, may be justly regarded as undignified and questionable. If the production of a condition of seminarcosis as a routine procedure in normal labor is shown to be a desirable necessity, such a method will soon enough be adopted by the profession. Thus far the evidence adduced is not sufficient to warrant such a course. The indiscriminate employment of the method is bound to be harmful, will detract from its possible value and will hasten its relegation to the great unknown where now repose so many exploded medical practises and fancies.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Treatment of the Third Stage of Labor.—Ahlfeld (*Zeitschr. f. Geb. u. Gynäk.*, Bd. lxxvi, Ht. 1) believes that the physiological separation of the placenta is hastened if the uterus is not handled after delivery. He claims that after a period of from one and one-half to two hours the uterus has contracted to such an extent that the removal of the placenta, which is in the vagina at this time, may be readily accomplished by external pressure. As the result of severe illness in the mother and disturbances in previous labors, therefore more frequently in multiparæ, we must hasten the third stage and be prepared for increased hemorrhage. If hemorrhage takes place the fact can be readily observed by inspection of the vulvar outlet and the constant application of the hand to the uterus does not afford any definite means for recognizing external hemorrhage. Ahlfeld believes that the less the uterus is handled from without, the less will manual separation of the placenta be necessary. If required the condition must be regarded as a pathological one and not due to the expectant method of treatment in such cases.

Spontaneous Rupture of the Uterus due to Muscular Degeneration.—Mandach (*Arch. f. Gynäk.*, Bd. ciii, Hft. 1) presents a very extensive study of a case in which rupture of the uterus took place during normal labor. Anatomical changes in the uterine muscles followed by rupture are ordinarily due to scars, particularly after Cesarean section. Less frequent observations have been made in cases of general, in contrast to local, uterine changes, which have resulted in lacerations. These include alterations of the elastic fibers, inflammatory processes, colloid and hyaline degeneration, and the musculature. The latter was determined to be the cause in the author's case, a para-v, forty years of age, with spontaneous previous labors. After rupture of the membranes the pains stopped and evidences of uterine rupture prompted laparotomy. The child and placenta were found in the abdominal cavity, having been extruded through a laceration in the posterior portion of the lower uterine segment. A Porro operation was done but the woman succumbed to a general peritonitis. Careful microscopical examination showed that the mucous membrane was very thin and the myometrium everywhere presented evidences of advanced hyaline degeneration. No evidences of specific disease were present in the placenta or elsewhere but the patient at autopsy was found to have had a parenchymatous nephritis and pyonephrosis, to neither of which could be attributed the degenerative condition present.

The Value of Fixation Abscesses in the Treatment of Puerperal Infection.—Santi (*Zeitschr. f. Geb. u. Gynäk.*, Bd. lxxvi, Ht. 1) has previously reported a series of eighteen cases of severe puerperal infection with six deaths, which were treated by the subcutaneous injection of 1 cm. of turpentine oil for the purpose of producing a fixation abscess. The same author now publishes a report of a series of twelve cases similarly treated, with only two deaths. Instead of a single cubic centimeter of the oil he employed from 4 to 5 cm. and according to the severity of the case repeated this up to five times with intervals of from twenty-four to forty-eight hours. The author is confirmed in his previously favorable attitude and believes that this method may save the patients in a certain number of cases and that these favorable effects are found in cases where every other method has been a failure.

Etiology of Eclampsia and Albuminuria.—Young (*Proceedings of the Royal Society of Medicine*, June, 1914) presents an anatomical and experimental investigation for the purpose of tracing the relation of this condition to accidental hemorrhage. He states that eclampsia and the albuminuria of pregnancy are due to the liberation of the products of early autolysis of the placenta and that this has been established by the following considerations.

(1) The toxemias are especially associated with recent infarction of the placenta. In severe cases, ending rapidly in labor, there may be no evidence visible to the naked eye of placental disease. If, however, the placenta is born several days after the attack, massive necrosis, obviously of recent origin, is seen. It requires some time for the necrosis to evolve into visible form.

(2) Placental infarction is due to an interference with the maternal blood supply of the part. It can be shown conclusively that the chorionic elements are dependent, immediately and directly, upon the maternal blood supply, and, so long as this is retained, can live, even where there is no fetal supply.

(3) The interference with the blood supply, which is responsible for the infarction, is not dependent upon a toxic state and, in point of fact, may occur in the most extreme form where there is no evidence of a toxemia *e.g.*, accidental hemorrhage. An examination of the placenta wherever there is definite evidence of an involvement of the maternal supply, invariably shows disease corresponding exactly to the area of this involvement. This disease will be evident to the naked eye unless the involvement is quite recent. The study of accidental hemorrhage was shown to be specially important in this connection.

(4) The placenta is so constructed that, if a part of it die, the products liberated from the dying patch can pass directly into the blood stream. The organ is unique in this respect. It thus arises that for the occurrence of a toxemia a circulation of blood round the poison-generating foci is necessary. An understanding of this fact at once dispels many of the difficulties associated with this study. It explains, for example, the cessation of symptoms after the death of the child (and separation of the placenta), and it explains the absence of a toxemia in cases of accidental hemorrhage (50 per cent. of the whole) in which the placenta is completely

detached by the blood clot, or by other means. The cases of accidental hemorrhage associated with a toxemia are those in which part of the placenta remains attached for some time after the separation of the adjacent part by a retroplacental bleeding. The necrosis of this part liberates the toxic materials.

The Effect of Salvarsan on Fetal Syphilis.—Meyer (*München. med. Wchenschr.*, 1914, No. 33) discusses the clinical and experimental phases of this subject based on a series of forty-three cases of syphilis during pregnancy in which the mother was treated with salvarsan injections combined with the intramuscular injections of salicylate of mercury. In forty-two cases living children were born, of which five died shortly after. In five instances a positive Wassermann reaction was obtained in the children. In the five cases where the children subsequently died, the author believes that the administration of both salvarsan and mercury were insufficient and is convinced that it is possible to avoid an infection of the child during intrauterine life by treating the mother. Compared with other series of cases, in which mercury or in combination with the iodides usually employed, better results as regards the child seemed to follow the combination of salvarsan and mercury. In order to determine the action of the salvarsan on the fetus, especially as regards the permeability of the placenta to the same, a series of animal experiments were undertaken. It appears that in placentæ examined for this purpose the arsenic content of the same corresponded to the arsenic content of the maternal blood circulating in the placenta. A placenta which is not diseased is not permeable for arsenic, but where syphilitic infection is present, arsenic can pass through the placenta. The prognosis for the child in maternal syphilis depends on the size of the dose of salvarsan and mercury employed. The least amount includes 1.5 gm., salvarsan and 0.5 gm., salicylate of mercury, although in a small percentage of cases a child may survive if a smaller dose is employed. In all cases, however, the children of syphilitic mothers, even if no clinical or serological evidences of syphilis are present after labor, should be subjected to antisyphilitic treatment.

The Biological Function of the Corpus Luteum.—Seitz, Wintz and Fingerhut (*München. med. Wochenschr.*, 1914, No. 3c) present an extended series of observations in which they study the chemical composition in the therapeutic application of this substance in irregularities of menstruation, using for the purpose the raw material obtained from the ovary of the cow. They believe that menstruation depends entirely on the functionating of the corpus luteum, which contains two bodies. The first is luteolipoid which possesses the power of stopping hemorrhage and used subcutaneously before or during the menstrual period, diminishes the amount of bleeding. The second body lipamin, which is a lipo proteid and a lezithalbumin. In experimental animals this produces a marked interference with the growth of the genitals and if used subcutaneously in the human subject brings about menstruation after amenorrhea. The authors believe that these two substances are antagonistic to each other and regulate the course of the menstrual period. Luteolipoid is especially indicated in bleeding at the time of puberty without an organic basis. In climacteric hemorrhages it only has effect when the coagulation process is slow. The substance is without effect in hemorrhages due to an inflammatory origin. In dysmenorrhea accompanied by marked flow, the luteolipoid exerts a favorable effect on the pains. Lipamin may possibly, if used for a specially long time, bring about menstruation in amenorrheic women. It is justifiable, therefore, to make attempt to stimulate the hypoplasia of the genitals by long and continued injections of lipamin. It also appears that in dysmenorrhea with lessened flow the lipamin if given before the period has the power to relieve the pains.

Utero-parietal Fistulæ Resulting from Conservative Cesarean Section.—A. Grosse (*Rev. mens. de gyn., d'obst. et de ped.*, June, 1914) says that fistulæ following the conservative Cesarean section are rather frequent. They are the result of infection, whether it be from nonsterile catgut, or other suture material, from infection of the suture from the seat of operation in cases that have had a hard labor and been frequently examined, in women who have had endometritis, especially gonorrheal, before labor, etc. In general the infection is of uterine origin and that of the sutures is secondary. The uterus or its contents may be septic before operation. When the membranes have been long ruptured infection may enter even as far as the peritoneum. The lochia forms an excellent culture medium for the gonococcus. The classical conditions for operation are operation before the beginning of labor with unruptured membranes. Infection may be recognized by the fetid lochia. Retention in the uterus of pieces of membrane adherent to the uterus may cause infection. Any conditions that interfere with perfect coaptation of the uterine wound tend to infection. The fistula may appear immediately after the section in the period of healing, or a long time after it, in which case it results from the elimination of suture material. There is apt to be a succession of abscesses. They may be external, or involve the walls of the abdomen and the cavity of the uterus as well. Seldom do they heal spontaneously. Some mild measures, such as injection may be used to bring about healing; or operation may become necessary. Preventive measures consist in the most rigorous asepsis and exteriorization of the uterus.

High Incision in Cesarean Section.—W. L. Thompson (*Johns Hopk. Hosp. Bull.*, 1914, xxv, 336) says that the location of the skin incision, high in the abdomen, above the umbilicus, renders it less subject to pressure than in the more convex and dependent portion; it receives better reenforcement from the recti muscles whose edges are nearer together at this point in the parous woman, and whose support is greater as the upper attachments of these muscles are approached. Its location precludes all possibility of adhesion between it and the rapidly contracting and retracting uterus, whose cut surface, by the time the uterus is emptied, is far removed from the abdominal incision. Its length, only 12 cm. in contrast with the usual incision of twice this length, leaves an exceedingly short cicatrix which is rendered almost inappreciable by the practice of subcutaneous suturing. Packing off the intestines not only keeps them out of the way during operation, but in the event of repeated vaginal examinations under uncertain aseptic precautions, prevents the possibly infected liquor amnii from inoculating the abdominal contents. Leaving the uterus *in situ* has more to recommend it than is at first apparent. It is an accepted fact that sudden reduction of tension in a body cavity tends to induce shock (from acute cerebral anemia); such an accident is scarcely possible with the uterus *in situ*. The common practice of delivery of the uterus and manipulation of the intestines carries with it the constant danger of infection of these structures. The location of the incision in the thick, muscular fundus minimizes the danger of rupture in subsequent labors, whereas the long incision in common use extends into or encroaches upon the attenuated lower uterine segment and further increases its vulnerability.

Determination of the Date of Fecundation in Woman.—P. Ancel and P. Bouin (*Bull. de la Soc. d'obst. et de gyn. de Paris*, June, 1914) state that the facts at present in our possession show the inaccuracy of the reflex nervous theory of fecundation, and we may conclude that the corpus luteum in women and in mammiferæ causes a preparation of the uterus for the fecundation of the ovum. In women ovulation occurs just before the appearance of the uterine phenomena, that is twelve to fourteen days before the menses occur, and not at the end of menstruation, and fecundation takes place from the fifteenth to the seventeenth day after the end of menstruation. To know the date of the deposition of the spernmatozoids in the vagina is not so important, since they may remain a long time in the genital organs of the woman without losing vitality. Not so the ovum; after two or three days this loses its vitality, is absorbed in the tube, and disappears. The theory of menstruation espoused by Pouchet and Pfluger is that the swelling of the Graafian follicle pressing on nerve endings in the ovary, stimulates the lining of the uterus to congestion, which becomes so great that blood oozes through. As soon as the follicle ruptures the stimulation lessens and the nervous pressure ceases. A second theory of Villemin and Fraenkel is that menstruation is determined by the action of an internal secretion of the corpus luteum, which is formed soon after the rupture of the follicle, and twelve to fourteen days before the next period. At the height of formation of the corpus luteum the congestion is at its maximum and menstruation occurs. Villemin has established statistics of ovulation from thirty-nine women, between the ages of twenty-five and forty-five years. He has shown that during full menstruation no ripe follicle is found; four to six days after menstruation there is found a corpus luteum in the stage of regression: and a follicle beginning to develop; fourteen to fifteen days after menstruation there is found in the ovary a follicle freshly ruptured or about to rupture; seventeen to twenty-two days after menstruation we find no new follicle developing but a corpus luteum in course of formation. Carl Ruge studied 106 ovaries and decided that ovulation occurs fourteen days before menstruation. The essential characteristic of menstruation is a preparation for the reception of the ovum which otherwise would be lost. The epithelium becomes modified by hypertrophy. These changes are found in all mammals. Therefore the authors conclude that ovulation occurs fourteen to sixteen days before menstruation and fecundation takes place fifteen to seventeen days after menstruation.

Korsakow's Psychosis Occurring during Pregnancy.—Korsakow grouped together a number of cases of apparent toxic origin, associated with polyneuritis, which were characterized by poor power of retention for recent events, disorientation for time and place, misidentifications, and confabulations, *e.g.*, the description of fictitious journeys and episodes. It was found that this psychosis developed most frequently on the basis of chronic alcoholism, but that it also occurred in connection with other toxic, and infective agents, *e.g.*, in febrile states, lead poisoning, and pregnancy. Later investigation also showed that the polyneuritic symptoms need not be a constant accompaniment of the psychosis.

D. K. Henderson (*Johns Hopk. Hosp. Bull.*, 1914, xxv, 261) reports two cases, one of which was associated with a tremendously generalized polyneuritis, while the other showed no polyneuritic symptoms, but mentally the picture was characteristic. The points upon which he especially lays stress are: The pregnant state must in certain cases be recognized as an important etiological factor in the production of peripheral neuritis, and of that condition known as Korsakow's syndrome. The neuritis caused may be either (1) local, *e.g.*, affecting one nerve or one limb, or (2) diffuse, *e.g.*, affecting all the limbs, and certain of the cranial nerves. The mental disorder characteristic of the condition is usually associated with a generalized polyneuritis, but, as evidenced by one case reported here, it may occur alone. The frequent history of hyperemesis gravidarum in association with the generalized forms of the disorder is so striking that it suggests a possible line of approach as to the elucidation of the nature of the toxin. Those patients who in previous pregnancies have suffered from severe vomiting, or other serious toxic phenomena, should be strongly urged to avoid any further pregnancies.

Hookworm Disease and Pregnancy.—J. S. Turberville's (*South. Med. Jour.*, 1914, vii, 862) practice shows seven cases of eclampsia in 300 pregnancies, a proportion even greater than that of lying-in hospitals where the worst of all kinds of obstetrical cases are handled. From this fact, from the fact that hookworm disease is prevalent, and that it frequently gives all of the signs and symptoms of the preeclamptic toxemia of pregnancy, it is fair to assume that uncinariasis bears its share in the causation of the increased frequency of puerperal convulsions in the South Atlantic States.

The Disadvantages of Scopolamine. Fonyo (*Zentralbl. f. Gynäk.*, 1914, No. 38) from a study of a series of cases in which scopolamine was employed, both during labor and in laparotomies, combined with morphine, pantopon, veronal, chloral and ether; among these were seventeen lumbar analgesias. The author discusses the subject very thoroughly and believes that the variation in the effect of the combination of the alkaloids is not due to differences in their composition or to impurities but to the emaciation and anemic condition of the organism, which increases the toxicity of narcotic substances and under certain circumstances this may lead to a fatal result. This applies especially in laparotomies where the preparations for operation include a low diet, catharsis and diminished ingestion of fluids. The latter brings about a diminution in the excretions, increases the lipoids in the brain, all of which contributes to an increase in the effect of narcotic remedies. The writer believes that the hydrobromide of scopolamine, both in its active and inactive forms, combined with morphine is not as reliable as is generally believed. Its action in therapeutic doses and in the presence of good general health is not toxic but in the changed condition of the organism during narcosis, its effect becomes manifested in a different manner.

Hypophysis Medication in the Hemorrhages of Puberty.—Hofstätter (*Gynäk. Rundschau*, vol. viii, No. 15) in commenting on the popular notion that menorrhagia at this period is due to anemia, calls attention to the newer researches which have shown that a close connection exists between this process and disturbed internal secretions. In accordance with the successful use of extracts of pituitary gland in such cases, the writer presents a series of twelve cases, including girls from thirteen to twenty-three years of age. In all of them the menorrhagias lasted for periods of from several months to five years. Nine of these cases improved rapidly and remained cured; one case reacted well at the beginning but later failed to respond to the treatment and the two remaining cases were not kept under observation sufficiently long to form a definite opinion. The writer employed various preparations but states that he obtained the best results with pituitrin and pituglandol. One cubic centimeter of the preparation was given at intervals of from one to three days.

Simultaneous Induction of Abortion and Sterilization.—Anderes (*Monatschr. f. Geburtsh. u. Gynäk.*, vol. xl, No. 4, October, 1914) in discussing the advisability of sterilizing patients in the presence of chronic disease, presents a series of fifteen cases in which the interruption of the pregnancy was accompanied by tubal sterilization through the abdominal route. The abdomen was opened by a Pfannenstiel incision, the uterus drawn forward and incised at the fundus between the insertions of the tubes. The contained ovum was then evacuated with the finger, the uterine cavity curetted and the wall sutured in two layers with catgut. Both ends of the tubes were then resected by splitting the peritoneum over the uterine end and cutting out a segment about 3 centimeters long, after which the peritoneal edges were turned in and sutured. The advantage of emptying the uterus in this way resides largely in the avoidance of the introduction of possible septic material from below. It is not necessary to pack the cavity after the operation as the cervical canal is sufficient for drainage. Hemorrhage is avoided by injection of an ergot preparation before operation.

The Pathogenesis of Eclampsia.—Vertes (*Monatschr. f. Geburtsh. u. Gynäk.*, vol. xl, No. 4, October, 1914) claims as the result of an extended series of animal experiments that the pregnant organism is the site of an anaphylaxis due to the absorption of decidual elements and that eclampsia is to be regarded as an anaphylactic shock. This is confirmed by the clinical symptoms which show certain similarities between this and other disturbances, as well as from the fact that the organs in the experimental animals showed the same changes as those in patients dying from eclampsia.

GYNECOLOGY AND ABDOMINAL SURGERY.

Tuberculosis of the Adnexa.—De Rouviale (*Bull. de la Soc. d'obst. et de gyn. de Paris*, June, 1914) states that the frequency of tuberculosis of the adnexa is variously estimated at from 11 to 90 per cent. of all cases of genital tuberculosis. The diagnosis is rarely established before operation. In cases in which there are evidences of a tuberculosis in other locations the probability of a local infection in the adnexa is great; but in many cases this does not exist. Where there is general tuberculosis, operation on the adnexa is contraindicated. Examination by the vagina or rectum gives no especial characteristics that would allow of a differential diagnosis; the aspect, consistency, and topography of the adnexa give nothing characteristic, and microscopic examination and data obtained from curettage are inconstant. Reactions to tuberculin are valueless for if they give a positive result, at the same time they do not show anything of the location of the tuberculous tissue. In many cases tuberculosis of the adnexa is accompanied by hypoplasia of all the genital organs. In sterile women with hypoplasia we may presume that tuberculosis exists, and most careful examination should be made of the peritoneum and adnexa. Tuberculosis is the cause of many cases of primary dysmenorrhea.

Subdivisions of Chronic Metritis.—W. F. Shaw (*Jour. Obst. and Gyn. Brit. Emp.*, 1914, xxvi, 73) says that "chronic metritis" is a clinical term which is used to designate uteri which are regularly enlarged, firm, and cause hemorrhage, pain, or leukorrhea. There are at least two classes of chronic metritis: (*a*) chronic subinvolution; (*b*) hypertrophy. These two classes can always be distinguished by the arrangement of the elastic tissue. Nulliparous and parous uteri can always be distinguished by the arrangement of the elastic tissue. (*a*) In a nulliparous uterus the elastic tissue is confined chiefly to the internal elastic lamina of blood-vessels with only very thin fibrils in the media, adventitia, and between the muscle fasciculi of the mesometrium; (*b*) in a parous uterus some thick strands of elastic tissue can always be found surrounding some of the blood-vessels. In the hypertrophic form of chronic metritis the arrangement of the elastic tissue is the same as in a virgin uterus. In the subinvoluted form of chronic metritis large deposits of elastic tissue are found in the walls and around the blood-vessels. The hypertrophic form is primarily due to a hypertrophy of the endometrium which stimulates uterine contraction, and in course of time produces a "work-hypertrophy." The chronic subinvoluted form results after parturition when, from any cause, involution does not occur normally.

Tumor at the Meatus Urinarius in the Female.—In reporting a case of tumor at the meatus urinarius in an infant of four and a half months, B. Tenney (*Annals Surg.*, 1914, lx, 359) reviews the literature of similar cases. He states that there are six conditions under which a tumor may appear at the female meatus. Papillary adenoma: This causes dysuria, pain with physical contact, sometimes slight bloody staining. It is not larger than 1 cm., and usually smaller, usually single, of varying shades of red, and is attached on one side of canal and usually the posterior. It is uncommon, except between fifteen and forty years; is rarely malignant, and frequently recurs after removal. Prolapse of dilated ureter: With dysuria and pollakiuria, a tumor cyst like a flaccid mucous membrane, "size of thumb" or less, appears either within a few weeks of birth or after months or years of vesical irritation and one-sided symptoms. A probe can be passed all around the pedicle except for one spot. Sometimes the mouth of the ureter can be identified. There is constant tenesmus. Prolapse of bladder tumor causes hematuria, dysuria, pollakiuria. Size and structure must vary. Rare in children. The tumor follows a long train of bladder symptoms. Prolapse of urethra gives symptoms like papillary adenoma except for absence of pain and tenderness. Through a central canal a probe passes into the bladder. It is said to occur in infants and elderly people. Prolapse of bladder mucosa: The only recorded case had symptoms corresponding to intravesical stricture and dilatation of the ureter followed by appearance of a fold of mucous membrane at the meatus. Prolapse of bladder wall: Pain, tenesmus, spasm and incontinence at intervals precede the appearance of a tumor, which is the "size of cherry" to "size of a duck's egg," tender, purple, pyriform in shape, and bleeds on handling. Sometimes the ureteral orifices can be identified on the back of the tumor. It may be reducible or not. It may occur in infants as the result of imperfect sphincter apparatus or in adults after injury to same.

Primary Carcinoma of the Fallopian Tube.—Primary carcinoma of the tube, while not common, is not as rare as has been supposed, and its possibility must be considered when a tumor lateral to the uterus is present. There have been four such cases in the Gynecological Department of The Johns Hopkins Hospital, which are reported by C. W. Vest (*Johns Hopk. Hosp. Bull.*, 1914, xxv, 305), and 132 in the complete literature. Definite symptoms are not regularly associated with the tumor, but one or more of the following are usually present: a watery, often blood-tinged, vaginal discharge; abdominal pain and induration on one side of the uterus; often a tumor is present. The discharge may be intermittent in character. Each tube is involved an equal number of times by the growth, while in about 28 per cent. of the cases both tubes are involved. If the condition is still confined to the tube a complete operation (hysterectomy, double salpingo-oophorectomy) should be done; otherwise only palliative measures can be employed. A careful macroscopic examination (and microscopic, if necessary), should be made before the abdomen is closed of every tubal tumor removed. In some cases the complete operation was done at a second laparotomy after the nature of the growth was discovered. A microscopic examination should be made of a serohemorrhagic fluid obtained from a lateral tumor by pelvic puncture. Such a tumor should be considered malignant until proven otherwise. Primary carcinoma of the tube may be present in association with an ovarian cyst. The tumor is of a high grade of malignancy. At onset it may be of slow growth, but recurrence is soon noted after operation. In most cases the condition has been too far advanced for permanent relief when surgical aid was sought. Only four patients are known to be well five years after operation.

Eruptions Following Operation.—F. B. McCarty (*Surg., Gyn. and Obst.*, 1914, xix, 509) says that eruptions following operation are of comparatively frequent occurrence, particularly after operations upon parts abundantly supplied with sympathetic nerve fibers, as the pelvic organs, where they occurred in 4 1/2 per cent. of a series of 1000 cases. These eruptions occur after any of the common anesthetics—ether, chloroform, or nitrous oxide. The condition is characterized by an interval between operation and onset of eruption, by lack of prodromata or of constitutional symptoms, by the presence of an erythematous or papular eruption with severe itching, and by the presence of an elevated temperature and moderate leukocytosis. The eruption often simulates scarlatina, measles, and the so-called drug exanthems. The exciting cause varies: drugs, enemata, anesthetics, and operative shock are included. The underlying cause is a vasomotor disturbance due probably to irritation of the sympathetic nervous system.

Nervous and Mental Disturbances Following Castration in Women.—A. Gordon (*Jour. A. M. A.*, 1914, lxiii, 1345) bases his remarks upon the study of 112 personal cases. He says that removal of the reproductive organs in women causes disturbances in the domain of the nervous system. These disturbances are of a purely functional nature. The disturbances are somatic and psychic. The psychic manifestations, while individually they belong to any of the varieties of psychoneuroses, do not constitute any of the well-established classical forms of psychasthenia. True insanities are not observed. The generally observed symptoms are: restlessness with a tendency to move from place to place; difficulty of self-control; dissatisfaction with all and everything; difficulty of finding contentment in one's own efforts; want of interest in all absorbing subjects and objects; indifference, indolence and pessimism. Sometimes there are outbreaks of anger with a tendency to attack. Among other symptoms may be mentioned: insomnia, gastrointestinal disturbances of a functional nature, headache, vague pains or paresthesias, also occasionally glycosuria; tendency to obesity is also observed in some patients. While the psychic manifestations are sometimes of a very disturbing nature, they do not present the characteristics of genuine psychoses. For example, indifference and want of interest in surroundings lack the depth of those of melancholia or of dementia. Restlessness, which is so frequently observed here, lacks the characteristic features of exaltation in the motor sphere observed in cases of mania. While individual symptoms resemble those of psychoses, the entire picture of each case lack the depth and definiteness of any of the forms of insanity. On the other hand, it is striking that the morbid phenomena persist with a remarkable obstinacy; at times they become more accentuated, at others some improvement is noticeable, but then it is only temporary. Some patients have been under observation during a period of ten years and the condition still persists unaltered. Individuals who presented various manifestations of psychoneuroses before they fell into the hands of surgeons, had their psychic phenomena decidedly aggravated after the uteri and ovaries or only ovaries were removed. As in the removed organs healthy portions of tissue were invariably found, it is to be supposed that the removal of the latter is in some relation to the morbid phenomena observed after the operations. The logical conclusion seems to be that one must be very cautious in advising operative procedures on the generative organs and the tendency should be to preserve as much as possible of any amount of normal tissue found in the uterus or ovaries. No operation should be advised on healthy organs if a woman complains of vague nervous disturbances.

Untoward Results of Pyelography.—M. Krotoszyner (*Surg., Gyn. and Obst.*, 1914, xix, 522) states that though pyelography is justly considered as of definite diagnostic value in some renal lesions (dilatation of renal pelvis and calices without functional disturbance, malposition of kidney, etc.), a correct diagnosis of the great majority of surgical kidney conditions is, nevertheless, feasible without this method. The general acceptance of strict contraindications to pyelography is the more indicated, since it is proved that solutions, though brought into the kidney pelvis with faultless technic and without undue pressure, may penetrate into the tubules and the surrounding kidney tissue and cause serious inflammatory lesions resulting in necrotic foci. Pyelography should, therefore, be restricted to those comparatively rare cases in which the correct recognition of a renal lesion by a combination of all other exact methods of examination is impossible.

L. Buerger (*Ibid.*, 536) records a case which shows that collargol or argyrol when injected into the renal pelvis for purposes of pyelography may penetrate into the renal parenchyma as far as the surface of the kidney, and that extensive necrosis and suppurative foci may be the consequence. Aseptic foci of necrosis may heal, all renal symptoms disappearing. Interference with the outflow of the silver salt, inflammation or congestion of the renal parenchyma, are predisposing factors in the production of the necrosis. Our endeavors should be directed toward evolving methods for the prevention of this untoward complication. Thorough evacuation of the renal pelvis through the ureteral catheter, aided by irrigations with saline solution or boric acid whenever spontaneous drainage does not occur, may be regarded as precautionary measures that should be employed in every case.

Atypical Male and Female Sex-ensemble.—D. B. Hart (*Edinb. Med. Jour.*, 1914, n. s, xiii, 295) says that the atypical or pseudohermaphroditic *sex-ensemble* case is either male or female, and in this is judged by the nature of the sex gland. The potent, nonpotent, and secondary sexual characters are not in the maximum-minimum ratio with congruence of the secondary sexual characters. The nonpotent in atypical *sex-ensemble* are thus increased, and the congruence of the secondary sexual characters is disturbed; this is characteristic of a probability result. It is to be specially noted that in the atypical female cases a prostate with lateral lobes only or with all the lobes may be present. In the atypical female cases the suprarenals are enlarged in all the accurately recorded cases, but the bearing of this in such cases is not accurately known. In male atypical cases part of the lower urinogenital sinus may be present, and may thus simulate an imperfect vagina; sometimes a hymen is present, and in Christopher Martin's case the external genitals and vaginal entrance resembled those of a female in every detail. Certain atypical male and female *sex-ensemble* cases may be "inverted" both in sexual feeling and in mentality. In atypical male *sex-ensemble* cases the testes may be pelvic, in the groin, or completely descended into the two halves of the scrotum. In certain atypical male cases the sexual instinct may be doubly exercised. In essence, such cases have this sequence developmentally—(*a*) Loss of parental determinants of the *sex-ensemble* at maturation; (*b*) the subsequent formation of *sex-ensemble* molecules with this loss when the determinants are distributed in the p. g. c. mass and p. s. c. mass; (*c*) in such cases the sex gland will have normal *sex-ensemble* molecules, and others unduly reduced. The latter will give rise to atypical male or female *sex-ensemble* in progeny; (*d*) this can be distributed again by such progeny to their offspring. In diagnosis the whole *sex-ensemble* must be taken into account; above all, that of the sex gland when accessible. No diagnosis can be based on one organ of the *sex-ensemble*, *e.g.*, on the presence of a prostate, hymen, apparent vagina, condition of larynx, or of the psycho-sexual feelings; the last may be inverted. The treatment is, as a rule, negative. An apparent vagina with labia means male sex-ensemble; in the atypical female sex-ensemble there is no external vaginal entrance, as it ends in the prostatic sinus.

Incontinence of Urine in Women.—D. Newman (*Lancet*, Oct. 17, 1914) says that the most common causes of simple incontinence of urine in women are injury during parturition and overdistention of the urethra and neck of the bladder by instruments. In other cases no history of traumatism can be obtained. The former are more amenable to surgical treatment than the latter, but even these may be much improved by the following operation, which is directed to diminishing the lumen of the first three-quarters of an inch of the urethra, and constructing a firm mound of mucous membrane on the floor of the bladder just inside the neck—to imitate the obstruction seen in enlargement of the middle lobe of the prostate in the male. With the patient in the lithotomy position, the posterior wall of the vagina is retracted. The bladder is distended with 12 ounces of boric solution. A straight steel bougie, No. 14, with a knob of the size and shape of a horse-bean half an inch from its point, is introduced into the bladder, at first fully and then partly withdrawn, so that the knob comes down to and locates the neck, and by elevating the handle of the bougie the knob is made to throw out the posterior wall of. the bladder immediately above the sphincter, and so project it backward and downward. Three sutures, one anterior and two lateral, are now passed through the lips of the os, and the uterus is dragged downward so as to give a clear view of the anterior wall of the vagina. A median vertical incision is now made from the uppermost point of the knob of the bougie downward over the knob and along the middle of the stem for a distance of 1 1/2 to 2 inches. With blunt-pointed scissors cutting on the flat the mucous membrane and muscular coat of the vagina are carefully separated on both sides of the median incision. The dissection should be made right down to the submucous tissue of the bladder and urethra, but great care must be taken not to expose the vesical mucous membrane itself. The vaginal mucous membrane is removed over a lozenge-shaped area, the center of which corresponds with the position of the most prominent part of the knob of the bougie; the upper angle is just over the point of the instrument. The lower angle corresponds with the stem, while the two other angles point outward, one on either side. Incisions are now made to join the apices, and a lozenge-shaped portion of vaginal mucous membrane is removed, exposing a corresponding area of raw surface, the floor of which covers the neck of the bladder and the first half inch of the urethra. A dam to prevent the too easy escape of urine is made by heaping up a bank of mucous membrane on the vesical side of the septum and supporting it by tightening the structures on the vaginal side. Make the first redundant, the second scant. The raw surface exposed is about 1 1/2 inches in length from above downward, and from side to side three-quarters of an inch. The broadest part of the lozenge is over the neck of the bladder. Sutures of chromic catgut are introduced as follows. On the left lip of the wound the needle is passed from left to right; it enters immediately under the vaginal mucous membrane to emerge one-eighth of an inch to the left of the center line of the bougie; it is then carried over the denuded surface to one-eighth of an inch beyond the right side of the bougie where it penetrates the tissue, to be brought out on the right lip of the wound. Six sutures are passed in this way. The bougie is then withdrawn and the sutures are tied, cut and buried. A second row of fine gut sutures is applied to unite the margins of the wound in the vaginal mucosa.

The Histology of Radiated Carcinoma.—Heimann (*Berl. klin. Wchnschr.*, 1914, No. 32) considers that the most important question in reference to the treatment of carcinoma by the *x*-rays, refers to the penetrability of this agent. For the purpose of judging this fact it is essential that carcinomatous uteri be obtained which have been subjected to intensive radiation before operation. The author has had an opportunity to examine five cases of this kind. In every instance the effect of the rays on the carcinomatous areas was extensive and the depth of their action was found to be about 3 cm. It is impossible, however, to draw any absolute conclusions as to the cure of the carcinoma from these findings because even in the cases which have been subjected to very intensive radiation, intact cancer cells may still be found. He believes that it is questionable whether radiation therapy in the future will entirely displace the results which have thus far been obtained with the knife, notwithstanding the fact that the effects of this method have been phenomenal, within limitations.

The Ovary in Fibroma Uteri.—De Jong (*Ann. de. gyn. et d'obst.*, May 1, 1914) has made a study of the condition of the interstitial substance of the ovary in fibroma uteri. Some authors deny the presence of an interstitial substance. Wallart says that there is such a tissue and that it increases in amount up to twenty years of age. Its maximum development occurs at puberty. Then it diminishes except in case of pregnancy. In case of a pathological pregnancy, such as hydatid mole, its development is increased. At the menopause the formation of the gland stops. The author thinks that in woman the name interstitial is out of place. The glandular cells are disseminated through the gland; the false corpus luteum is a formation of the same nature as interstitial tissues in animals. Bouin considers the interstitial substance and the corpus luteum as two glands of internal secretion in animals. They exist in women as atresic corpora lutea and periodic corpora of pregnancy. In these formations there are signs of cellular activity and fats and pigments are included in them. In cases of fibroma these cells are fatty and atresic. They appear as lutein cells, as atresic follicles with a luteinic layer, and as follicular luteinic cysts. The author describes personal cases.

Elimination of Preventable Mortality in Surgical Treatment of Acute Abdominal Disease.—F. G. Du. Bose (*South. Med. Jour.*, 1914, vii, 650) says that there is a preventable death rate of approximately 7 per cent. in acute abdominal diseases. To overcome this a diagnosis of at least the presence of an acute abdominal disease must be made at the first visit or less than twelve hours after its onset. Early operation is the safest of all treatment. The measures advised by the advocates of masterly inactivity are never safe, are a last resort, to be used only on those unreasoning people who refuse surgery, or on those who are seen late in the disease, and on these only until they can be brought to a hospital and have operative relief. No one should teach and report statistics of cases treated by the expectant plans without paralleling such records with those in which immediate diagnosis and prompt surgical operations are done, allowing a comparison of results in each series. Surgeons must encourage a more intimate relation with the internist and have him witness operations and there study the living pathology. Both surgeons and internists must appreciate the fact that the symptoms are not always in direct ratio to the severity of the unseen pathological process.

Suture of the Levator Ani in Perineorrhaphy.—H. Jellett (*Lancet*, Aug. 1; *Med. Press, Aug.* 5, 1914) states that routine sutures of the levator ani, which is an essential part of perineorrhaphy, is always practicable, except when the muscle is wanting owing to atrophy after injury. Such absence is very rare, and, when it occurs, it is impossible to reconstitute the perineum satisfactorily. The exposure and suture of the levator ani is neither difficult nor dangerous. The operation is carried out as follows: The extent of the perineal tear is carefully determined, and its anterior edges are marked out by bullet forceps. A third bullet forceps is applied to the perineal skin just behind the posterior edge of the tear. The position of the separated edges of the levator ani is determined by palpation through the mucous membrane of the vagina. An incision is then made from side to side along the line of junction of the skin and the vaginal mucous membrane. This incision cuts through the skin and any underlying scar tissue. A flap of vaginal wall is then dissected up off the underlying rectum. A triangular space is thus exposed, which is bounded laterally below by the remains of the superficial vaginal and perineal muscles, and at a deeper level by the perineal muscles, and at a deeper level by the pubococcygeal fibres of the levator ani muscle while its floor is formed by the rectum. It is then an easy matter to catch the edges of the levator with clip forceps or dissecting forceps, and to draw them downward and inward until they meet in the middle line. Three or four interrupted sutures of catgut are then passed through them from side to side so that when tied they will approximate them in the middle line; for the present, however, they are left untied. The next step is to trim the vaginal flap into proper shape, so that, when the operation is complete, there may be no redundancy. The cut edges of the flap are then brought together by a continuous catgut suture passed from above downward, and ending at the vulvar orifice. This being done, the catgut sutures in the levator muscle may be tied. The last step consists in the introduction of silkworm gut sutures passed so as to close the skin edges of the perineal wound. These sutures are passed from side to side, and traverse the skin, and the remains of the superficial perineal muscles and also the levator muscle so as to supplement the buried catgut sutures. Any bleeding vessel, if of large size, should be caught and tied, but, as a rule, the best method of stopping bleeding is by proceeding rapidly with the operation.

Radical Operative Treatment of Cancer of the Uterus.—The statistics of his work collected by T. Wilson (*Lancet*, Aug. 1; *Surg., Gyn., Obst.*, 1914, xix, 456) include fifty cases of cancer of the uterine body. Of these 62 per cent. were operated upon with a mortality of 6.4 per cent. Twelve remained free from recurrence for five years or more, showing an absolute curability of 24 per cent. For cancer of the cervix there were fifty-two operations in 288 patients, an average operability of about 18 per cent. One death followed operation and sixteen patients survived five years and upward, an absolute curability of 5.5 per cent. Abdominal hysterectomy for the same was performed in thirty-two of ninety-eight patients, an operable ratio of 32.5 per cent. Nine deaths followed operation and ten cases survived the five year period, giving a percentage of 10.2 of absolute curability. Of the patients surviving operation 16 of 51 = 31 per cent. of the vaginal, and 10 of 23 = 43 per cent. of the abdominal, remained well and free from recurrence for five years and upward. The operable ratio has doubled in the last ten years, and may be expected to rise considerably further, when the possibilities of the operation are grasped by the profession at large and by the public. The total number of patients remaining free from recurrence for five years and upward has also increased nearly twofold in the last decade, and we may hope before long with the surgical methods now at our disposal to achieve an absolute curability of 25 per cent. of all cases of cancer of the uterine cervix.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATION.

ERYTHEMA NODOSUM WITH FACIAL PARALYSIS AND HEMIPLEGIA.

BY

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(With chart.)

THE following most unusual case, seen by me recently in private practice, presents some points of general interest:

Case. Erythema Nodosum in an Infant with Unusually Severe Febrile Course and Unusual Complications, i.e., Facial Paralysis, Convulsion, Hemiplegia, Ending in Complete Recovery.

The patient is a male child, twenty five months old. There is nothing of importance in the family history. The natal and postnatal history are normal. The child was breast-fed for nine months and has been well with the exception of occasional colds. He has had no previous infectious disease excepting whooping cough, which will be described later. He is well developed but of pale complexion, and is strong, standing and walking well. He was rather late in learning to talk, but is now learning rapidly, speaks short sentences, and is very intelligent. Dentition is completed, the last teeth appearing during the present illness.

During the past summer there was a house epidemic of whooping cough in the family in the course of which the two children and the nurse maid were affected. This little patient had an attack of moderate severity, lasting eight weeks and without complications. After this he was well and practically free from cough for four weeks before the onset of the present illness.

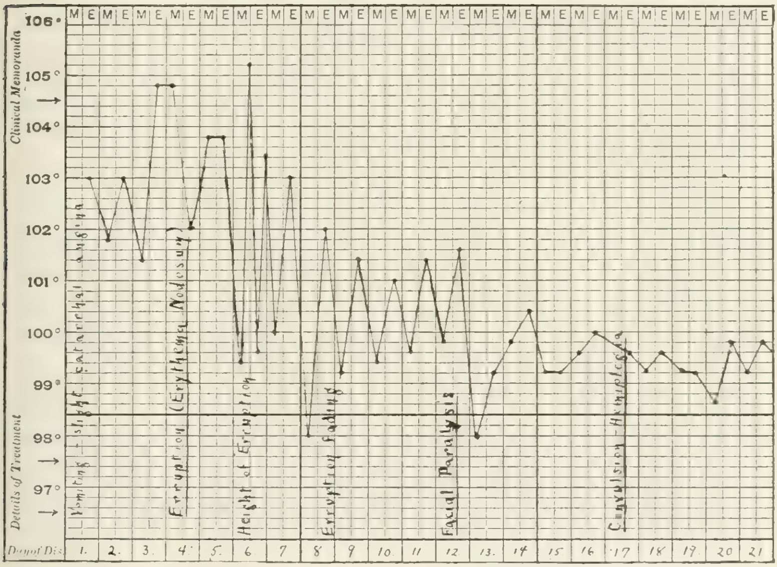
The present illness began October 8, 1914, with vomiting following a coughing spell. The child appeared sick but presented no further symptoms except slight hoarseness, which disappeared on the following day. During the next few days he presented the picture of an acute infection, running a remittent temperature between 101.4 and 104.8, accompanied by drenching sweats. During the height of the fever the child presented the usual febrile symptoms of young children—prostration, irritability, twitching of the extremities. At other times he seemed bright, played with his toys, had a good appetite, and showed no evidence of pain or other subjective symptoms. Physical examination was practically negative. There was slight reddening of the pharynx, but without swelling, exudate, increased secretion or glandular enlargement. Repeated complete examinations were negative, including the ears, rectum, etc. There was no cough or dyspnea, and the heart and lungs were clear. The urine contained a trace of albumin at first, but no casts or cells. A Widal was negative, but unfortunately no further blood examinations were permitted. Meanwhile the condition of the child became increasingly puzzling and alarming, as he presented the picture of a severe sepsis without any localizing signs whatever.

On the fourth day of the illness characteristic lesions of erythema nodosum appeared on both legs. These lesions consisted of an elevated, red, edematous area, about 2 inches in diameter just above the middle of the anterior surface of each tibia. This area was dark red in color, more anemic in the center, with an indefinite border, and pitted on pressure. Inside the periphery of this oval area were 8 to 10 firmer spherical nodules of a purplish color and averaging about 1 cm. in diameter. The lesion on the left leg was somewhat smaller and contained fewer nodules than the one on the right. These lesions felt decidedly hot and were slightly tender. The child lay with the knees drawn up on the abdomen and cried when one attempted to straighten his legs, this attitude suggesting the possibility of slight joint pains. There was, however, no objective evidence of involvement of any joints or bones. The only other skin lesions present were two small urticarial weals on the right thigh.

During the two days following the appearance of these skin lesions the temperature gradually fell, reaching 99.4 on October 13, then rose abruptly to 105.2. Up to this point the swellings on the legs became slightly more extensive and more elevated and tense. On the following day they began to recede and to undergo the usual color changes of extravasated blood; and at the end of a week from their first appearance they had disappeared, leaving a few small, faint, brown pigmented spots. Simultaneously with the appearance of the lesions of erythema nodosum the posterior cervical glands became swollen. The largest gland was the size of a bean. They were firm, movable, and slightly tender. With the fading of the eruption the temperature subsided but still remained elevated and remittent between 99.5 and 101.5. The child now appeared bright and quite well.

October 19, on the twelfth day of the disease and eight days after the eruption, a left-sided facial paralysis developed. On the preceding evening the face appeared normal; when examined in the morning, the paralysis was complete. When the child cried, the left side of the face remained flat, the left eye wide open, and the mouth drawn to the right. In sleep the lids of the left eye remained partially separated, exposing a narrow strip of conjunctiva. There was no pain or tenderness in the region of distribution of the facial nerve, no rise in temperature or general symptoms. On the succeeding days the temperature dropped still lower, remaining below 100.

October 24, on the sixteenth day of the illness, a general convulsion occurred, followed by temporary left-sided hemiplegia. When seen by me, the child was in complete coma and with violent clonic convulsions involving the entire left side of the body, the right side meanwhile remaining flaccid. The eyes were wide open, looking upward and to the left, and the pupils dilated. The convulsions later became general, involving both sides of the body and including spasms of the diaphragm. The patient reacted promptly to chloral hydrate, 15 gr. by rectum. The entire seizure lasted about one hour, during which time coma and convulsions were constant. The sleep which followed was occasionally disturbed by automatic coordinate movements of the right arm and leg, the extremities on the left side remaining motionless and flaccid. Later the child was partially aroused, when he moved the right extremities vigorously but made no attempt to move the left extremities. There was a Babinski and slight ankle clonus on the left side; no other reflexes could be elicited. There were no signs of intracranial pressure or meningeal irritation. An ounce of pure blood was passed from the rectum following several large bowel movements. This was not repeated. Six hours after the onset of the convulsion the child sat up, was completely conscious and showed almost complete return of power to all extremities.



After this the patient made a good recovery. There were no further complications except during the fourth week of the illness, when there appeared successive crops of strophulus papules (lichen urticatus) during several days. These lesions appeared on the flexor surfaces of the legs and on the buttocks with a few scattered papules on the trunk. The temperature remained slightly elevated until about six weeks after the onset of the disease, the course being apparently prolonged by an incidental coryza. The child suffered marked loss of weight and strength during his illness, but rapidly regained these during convalescence. An obstinate constipation yielded to a diet rich in carbohydrates, to which I also attributed the rapid gain in weight.

The facial paralysis remained complete for one week after its appearance, when it gradually receded. The improvement was first noted in better closure of the eye and slight movement of the corner of the mouth. Two weeks after the appearance of the paralysis the face appeared practically normal, excepting a scarcely noticeable asymmetry which remained for some time.

Partial paralysis of the left arm and leg also persisted for several days. In the arm this consisted of general weakness and tremor with inability to flex the fingers or adduct the thumb, as in median nerve paralysis. The child was allowed to walk one week after the convulsion, and for the first few days slightly dragged the left leg and turned the foot in, as in peroneal paralysis. Two weeks after the hemiplegic attack he had regained full power in his extremities.

I have presented this case in some detail both on account of its unusual features and because of the unusually clear clinical picture which it presents, an analysis of which may possibly throw some light from the clinical side upon the nature of this condition. Erythema nodosum was first described by Willan,(1) in 1799 as a dermatological condition. Trousseau(2) in 1866 pointed out that this lesion was a symptom of a general disease. Hebra,(3) 1874, differentiated it from the similar condition described by him, erythema exsuditavum multiforme. Many authors have regarded erythema nodosum as a form of erythema multiforme, notably Max Joseph,(4), v. Zumbusch,(5), Moro,(6), but most writers at the present time regard these two conditions as distinct. Nevertheless the literature has been confused by observers failing to differentiate these two diseases. Differential points are the general distribution and multiform character of the lesions of *erythema multiforme*, with the absence of general symptoms and complications, a tendency to relapses, and occurrence at all ages. These characteristics are contrasted with the unique and almost invariable localization and the typical form of the lesions of erythema nodosum, the severity of the general symptoms and frequency of complications, immunity conferred by a single attack and occurrence in young individuals. These characteristics of *erythema nodosum* are familiar features in the study of infectious diseases. The general course of the case cited above reminds one of a typical scarlet fever attack—acute febrile onset, appearance of the eruption on the fourth day at the height of the febrile course, coincident subsidence of the eruption and temperature, and outbreak of so-called toxic complications during apparent convalescence in the second and third weeks. I merely wish to emphasize in the case reported here the similarity of the clinical course to that of the common infectious diseases, without entering into a criticism of the various etiological theories which are being discussed at the present time. The chief subject of discussion in recent years in connection with erythema nodosum has been the relation of this disease to tuberculosis. There seems to be nothing in the symptomatology of the above case which can be associated with our pathological conception of tuberculosis. I do not wish to generalize from this one case but merely offer it as a clinical contribution to the study of the disease.

The unusual features of this case are the extreme youth of the patient, the severe febrile course, and the neurological complications. This affection is most common in the second decade, and is very unusual at the age of my patient, twenty-five months. Gerhardt(7) states that erythema nodosum scarcely ever occurs under five years. Fuhrman(8) described a case in a new-born child Duckworth(9) reported a case in a child of eighteen months, and Pollack(10) reported four cases in the twenty-third and twenty-fourth months. The occurrence of the severe febrile reaction and of the nervous symptoms may be attributed to the instability of the temperature and the nervous system in young children. Nervous complications in this disease are rare. Baumler(11) reported a case with tenderness of the nerve trunks, Lewin described neuralgic pains in one case, Quincke(12) reported a case with bilateral peroneal paralysis, Hegler(13) reports one case with sciatic tenderness and one with hysteria, Jolly(14) reported a case with psychosis. Various authors have referred to the occasional occurrence of facial paralysis and peroneal paralysis. I can find no reference to erythema nodosum associated with hemiplegic or other cerebral attacks. The prognosis of the neurological complications of this disease is usually good. In fact the disease as a whole is almost always a benign one.

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1219 Connecticut Avenue.

ANNUAL JOINT MEETING OF THE NEW ENGLAND PEDIATRIC SOCIETY, THE PHILADELPHIA PEDIATRIC SOCIETY, AND THE PEDIATRIC SECTION OF THE NEW YORK ACADEMY OF MEDICINE.

Held at the New York Academy of Medicine, November 5, 1914.

The President of the New York Academy of Medicine,

William M. Polk, M. D., *in the Chair.*

The visiting physicians spent the day inspecting the new building of the Department of Health and the exhibit of the Bureau of Child Hygiene; the exhibit of the New York Milk Committee at its Infant Welfare Experiment Station, 117 Washington Street, the Research, Antitoxin and Vaccine Laboratories of the Department of Health and the new pavilion for measles at the Contagious Disease Hospital. While at the Laboratories the visitors witnessed a demonstration of Negri bodies in Trachoma by Dr. Anna M. Williams and a demonstration of the Schick reaction by Dr. William H. Park and Dr. Zingher. In the afternoon a visit was made to the Children's Wards of the Presbyterian Hospital and to Rockefeller Institute and Dr. Holt gave a clinic at the Babies' Hospital.

EXPERIMENTAL AND CLINICAL STUDIES IN HEMOLYTIC JAUNDICE WITH SPECIAL REFERENCE TO THE EFFECTS OF SPLENECTOMY.

Dr. Edward B. Krumbhaar of Philadelphia said that the title of his paper would be more correctly given as Experimental and Clinical Studies in Hemolytic Jaundice and Allied Conditions with

Special Reference to the Effects of Splenectomy. The author considered first the experimental work which had been done by Dr. Pearce, himself and other collaborators in the laboratory of Research Medicine of the University of Pennsylvania. Although at first they were concerned with the relation of the spleen to hemolytic jaundice, they quickly found themselves confronted by the broader problem of the relation of the spleen to blood formation and destruction in general. The study of the various phases of this problem had brought out many explainable facts, but also some that were paradoxical. It must be borne in mind that they were dealing with a series of interactions between several viscera that were so complex that it was doubtful if experiments dealing with but a single phase could be of much value. Their first experiments confirmed and elaborated the observations of Banti and Joannovics that it was more difficult to produce jaundice by means of hemolytic serum in splenectomized than in normal dogs. The hemolytic serum was prepared from rabbits after repeated injections of dog's red blood cells and amounts proportionate to body weight were given to splenectomized and normal dogs in amounts just too small to cause death. The lessened tendency to jaundice was shown in the test animals at various periods after splenectomy. Attempts to explain the cause of this phenomenon led to the study of the blood changes that followed splenectomy. He had observed that the resistance of the red cells was increased after splenectomy both to hypotonic salt solution and to immune serum. Austin noticed that the greatest resistance to jaundice occurred at the same time as the greatest anemia developed and to test the connection between the two gave hemolytic serum to animals made anemic in other ways. He found the same resistance to jaundice, so concluded that the phenomenon was partly due to the more resistant erythrocytes and partly to the fact that less blood was destroyed because there was less blood present to be destroyed. Seeking a cause for the anemia this produced by removal of the spleen, one would naturally test the blood-forming power of that organ comparing the blood going to and that coming from it. Several authors had claimed to have found more red cells, white cells, and hemoglobin in the splenic vein, but their experiments on these lines were negative and they thought that the dictum must be accepted that the red cells at least were formed only in the bone marrow. They had been unable to confirm the explanation of this anemia offered by Asher and his pupils that after splenectomy increased amounts of iron were lost through the stools. They did find, however, that injection of splenic extracts intraperitoneally had a marked temporary effect in raising the count of erythrocytes, hemoglobin, and leukocytes, presumably due to stimulation of the bone marrow. A possible explanation of the anemia following splenectomy, therefore, might be that the bone marrow was deprived of a stimulating hormone. Explanation of the later recovery from anemia might be found in that the lymph nodes were enlarged and presumably had taken over some of the function of the spleen, while Pearce and Pepper found that the bone marrow of splenectomized dogs frequently showed signs of active regeneration at the periods when the anemia was being recovered from. One of the apparent contradictions that had appeared was that in spite of the fact that splenectomized dogs showed less tendency to jaundice when hemolytic agents were administered, nevertheless such agents caused a greater fall in blood counts, a more lasting damage and a greater fragility of the red cells than in normal dogs. Apparently the lessened tendency to jaundice was connected in some way with the anemia of splenectomy, while the change to greater fragility and lasting anemia itself was dependent on some unknown factor brought into operation by the loss of the spleen. Banti had brought forward evidence of special hemolytic activity of the splenic extracts and of dissociated hemoglobin in the splenic vein. Their observations had failed to substantiate these claims. Joannovics and Pick had shown that chronic toluylendiamin poisoning caused fatty changes in the liver with the liberation of unsaturated fatty acids, and Eppinger and King had shown that after splenectomy the amount of blood fat and cholesterin rose and the iodin number (combining value of the unsaturated fatty acids) of the blood dropped (both indicating lessened degrees of hemolysis). In clinical conditions associated with blood destruction, also, they had found an abnormally high iodin number, and this was reduced after the case had been improved by splenectomy. The unsaturated fatty acids were well known as hemolytic agents and the less blood destruction after splenectomy might be thus explained.

The author then proceeded to show what bearing their experimental work might have on the different types of splenomegaly with anemia, namely, Gaucher's, Banti's, von Jaksch's, and the two types of hemolytic jaundice, the Hayem-Widal, or acquired form, and the Chauffard-Minkowski, or congenital or hereditary form. These were better differentiations of the types of disease which were formerly grouped under the term "splenic anemia." He gave the history and described in detail each of these types in so far as was possible in the light of present knowledge. He stated that Gaucher's disease, in spite of being frequently included among other forms of splenic anemia, had but little fundamentally in common with them. The negative character of the symptoms might cause it to be confused with Banti's disease until pathological examination was attained. This should always admit a certain proper diagnosis to be made. The most prominent symptom was the progressive enlargement of the spleen, the blood changes being not very characteristic, the anemia of the chlorotic type and not very severe. A definite leucopenia was usually found, while jaundice and ascites were rarely present. A brownish discoloration of the skin had been noticed with a peculiar wedge-shaped thickening of the conjunctivæ. After describing the more familiar picture of Banti's disease the writer stated that its pathology and etiology were still undetermined. An apparently identical syndrome could be brought about by thrombosis of the portal or splenic veins, and similar clinical pictures had followed various infections, local trauma, etc. The unquestioned improvement, however, which followed splenectomy proved that the altered spleen was at least an important pathogenic factor. One would not expect the removal of a largely fibrotic organ to be attended with marked somatic changes and it was precisely in the earlier stages of the disease in which splenectomy had proven most beneficial.

The anemia infantum pseudoleukemica of von Jaksch was in all probability not an independent condition but represented an atypical response of the infantile hemopoietic system to one or other of the primary diseases of the blood, leukemia, pernicious anemia, the secondary anemia of rickets or syphilis, or the formerly unrecognized types of hemolytic jaundice.

The acquired and congenital familial types of hemolytic jaundice with splenomegaly, frequently grouped under such titles as hemolytic jaundice, chronic family jaundice, etc., possessed rather characteristic differences and he had deemed it advisable to follow the continental custom and consider them as independent conditions. In the congenital type the resistance of the red blood cells to hypotonic salt solution was much diminished and this furnished a simple differential test. The cardinal symptoms of these types of hemolytic jaundice with splenomegaly were found to be a chronic enlargement of the spleen, existing with an acholuria, nonobstructive jaundice, and anemia frequently paroxysmal in character and varying in intensity. Increased blood destruction was indicated by increased urobilin in the urine, and various characteristic changes were found in the blood, the red cells showing diminished resistance to hypotonic salt solution, there was an increased number of reticulated cells with vital staining and in the acquired form the phenomenon of autoagglutination of the red corpuscles. In the congenital form of the disease the subjects were more icteric than sick; the acquired form on the other hand, was usually ushered in with a definite attack of illness, the anemia became much more grave, and the patient was distinctly more anemic than jaundiced. The familial form appeared more as an inherited dystrophy of the hemopoietic system, rendering the red blood cells more easily destructible. On this basis Chauffard at first advised against splenectomy in this type, but subsequent cases had shown such an improvement after the removal of the spleen that it would seem as if removal was advisable whether or not it was the primary seat of the trouble. The author grouped the congenital with the familial type of hemolytic jaundice with splenomegaly. Many atypical forms of the conditions had been noted by various observers which it did not seem necessary to dignify with a separate name.

In considering the pathogenesis of these types of disease the writer stated that a hepatic or a luetic etiology had been largely discarded. He discussed the two views, namely, that the primary lesion was in the blood, a dystrophy of the red cells, or either primarily or indirectly in the spleen and concluded that the attractive combination of the splenogenous and hemocatatonistic theories at present seemed most plausible.

The study of the morbid anatomy in these conditions had not been very productive. The author had collected eight autopsies and seven splenectomies which showed chiefly congestion especially of pulp cords with increased pigment and macrophages.

After reviewing the various ineffectual therapeutic measures which had been employed by various authorities, Dr. Krumbhaar stated that splenectomy offered the most hope for improvement or cure and that it should be considered with due regard to conservatism in all these diseases in which there was evidence of increased blood destruction and that in early Banti's disease and hemolytic jaundice, at least, the results had been excellent. In pernicious anemia, although improvement had followed in some cases, the value of splenectomy was more dubious and this grave operation should only be tried where the indications were clear and other methods had proved unavailable.

ACUTE ACID INTOXICATION IN INFANTS AND CHILDREN: A STUDY OF 100 CONSECUTIVE CASES IN APPARENTLY EPIDEMIC FORM.

Dr. Carleton R. Metcalf of Concord, N. H., presented this report of an epidemic which occurred last winter at Concord, N. H. There were in all 200 cases with nine fatalities. The report presented consisted of 100 tabulated cases. The author considered the bearing of such etiological features as age, environment, milk, water, diet and neurotic temperament, none of which, nor all together, seemed to account for the outbreak. The tabulated report showed the frequency of such symptoms as diarrhea, vomiting, wasting, retracted abdomen, abdominal pain, icterus, etc. He also described the stools, vomitus and urine. The treatment consisted chiefly in dietetic measures and in the administration of soda and the citrates. The author also discussed the source of the acetone bodies and their relation to autointoxication.

THE OCCURRENCE AND SIGNIFICANCE OF MELITURIA IN INFANTS SUFFERING FROM NUTRITIONAL DISORDERS.

Dr. Oscar M. Schloss said the work concerned primarily the nature and significance of the reducing substance which commonly appeared in the urine of infants affected with nutritional disorders.

Sugar which was used in metabolism was carried by the general circulation and it was obvious that sugar which appeared in the urine was derived from the blood sugar.

Recent work had shown that the normal blood sugar in infants ranges from 0.07 to 0.11 per cent., figures which were practically identical with those which obtained for adults. Although there was a tendency for the blood sugar to maintain a constant level, striking changes might occur following the ingestion of carbohydrate food. Time did not permit a discussion of alimentary hyperglycemia but it was sufficient to state that there was often a definite increase in the blood sugar shortly after a meal which reached its maximum in from one-half to two and one-half hours and then decreased.

This increase might be effected by starch as well as sugar though the rate of increase was slower and of a lesser degree. Due to this occurrence the blood for examination was usually withdrawn about three and one-half hours after a meal.

There was a direct relationship between increased blood sugar and melituria. As a rule, a continued increase in blood sugar led to an excretion of sugar in the urine although this effect might not be immediate. Often the hyperglycemia might precede the melituria for some time. A detailed consideration of the significance of increased blood sugar could be of little benefit for despite the great amount of work done in the mobilization and utilization of sugar, especially in diabetes, there are many of the essential factors which are unknown or under discussion. It seemed safe, however, to assume that hyperglycemia meant a disturbance in the balance between mobilization and consumption of sugar and often signified a decreased power of burning sugar, provided that the patient was afebrile and the diet normal.

The detection of a reducing substance in the urine of infants affected with gastroenteric disorders was by no means recent. Most of the earlier writers considered that the sugar was lactose derived from the food. Langstein and Steinitz found galactose in addition to lactose in fourteen of thirty-eight cases of melituria. Luzzato also found galactose in the urine of infants.

Finkelstein and Meyer were led to attach great importance to the melituria in nutritional disorders. They divided the cases into two groups. 1. The appearance of lactose in the urine was considered indicative of an intestinal lesion through which lactose was absorbed before it was split by the inverting enzyme of the intestinal secretion. 2. When galactose was found in the urine it was thought that the underlying cause was a diminished sugar tolerance, the liver probably being at fault.

Dr. Schloss.—My work comprised the study of the blood and urine of 235 infants. Preliminary tests of the urine were made by Benedicts and Nylanders reagents and in case the reducing substance was present in sufficient amounts further tests were carried out to determine its nature.

There were forty normal infants whose blood sugar ranged from 0.068 to 0.11 per cent. All were free from digestive disturbances and none showed the presence of sugar in the urine.

The remaining 195 cases represented nutritional disorders ranging from the milder weight disturbances and dyspepsia to cases of severe intoxication. The cases were roughly divided into three groups, mild, moderate and severe.

Charts were shown which demonstrated that there was an association between an increased blood sugar and the presence of sugar in the urine. As a rule, the cases with melituria showed hyperglycemia.

The next question considered was the nature of the sugar in the urine. In most instances the percentage ranges from 0.05 to 0.1 per cent. In such cases a determination of its nature with any degree of accuracy is impossible. In twenty-seven cases, however, the urine at some time contained 1 per cent. or more of sugar and further tests were made to determine its nature.

These examinations were shown in tabular form which demonstrated that the sugar was usually galactose or dextrose. Lactose occurred but not alone. It was always associated with galactose.

The important facts brought out were: 1. the melituria is usually accompanied by an increase in blood sugar. 2. The sugar in the urine is a monosaccharide. These results indicate that a gross lesion of the intestine is not a direct cause of the melituria but indicate strongly that the direct cause is a lowered tolerance to sugar.

To definitely determine this question tolerance tests were made on normal infants and others affected with nutritional disorders. The results showed definitely that there was a lowered tolerance to sugar in the nutritional disorders.

(Owing to the lateness of the hour there was no discussion.)

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

The Tuberculous Child.—Since the conception of the campaign to suppress tuberculosis was inaugurated three distinct steps have been noticeable in its development: the early diagnosis of pulmonary tuberculosis, effort directed toward an adequate provision for those suffering with the disease in its advanced form, and thirdly, recognition of the child as an important factor in the problem. From 5 to 10 per cent. of all cases are due to infection through milk, the type generally showing itself as tuberculosis of the joints, peritoneum or glands. With the elimination of the tuberculous cow as a source of food this source of disease will be suppressed. The great avenue of pulmonary infection is through direct inhalation. In a great majority of cases in early life, the tuberculous infection merely shows itself as a state of chronic ill health or of general debility.

C. Floyd (*Bost. Med. and Surg. Jour.*, 1914, clxx, 687) says that if we surround the child who has been exposed to tuberculosis in the susceptible years of life with healthful conditions in the home, healthful conditions of study, and if we prevent its early entrance into the confinement of factory or workshop life and do this on a sufficiently large scale we have the solution of the problem of the tuberculous child in our hands.

Intestinal Infection in Infants.—H. Schelbe (*Jahrb. f. Kinderheil.*, 79, Bd. xxix, H. 5, 1914) says that we no longer speak of acute epidemics of intestinal infection, because we have learned to feed children better. Chronic infections are often referred at present to the bacillus coli. Others regard them as parenteral infections, due to catarrh of the respiratory organs. The author gives an example of how careful we should be in our diagnosis of the etiology of such affection. In one house sixteen children sickened within two days, only four in the house remaining well. All had anorexia, fever, and malaise. Seven of them lost considerable weight. None died, and almost all were improved in three days, after proper feeding. When we come to consider the cause of the epidemic we find that all took the same milk, and the children who remained well took no milk at all. Parenteral affections can be ruled out because all the children began to be sick at once and there were no cases of grippe or catarrh of the respiratory tract among them. Therefore the source of infection must be sought in the food alone. In examining the stools no typhoid, paratyphoid or dysenteric germs were found.

Analysis of Thymus Extract Action.—Rudolf Fischl (*Monatsschr. f. Kinderheil.*, Bd. xii., Br. 8, 1914) has made a careful investigation of the actions of thyroid extracts in dogs. He finds that the action of thymus extract is very variable. Its effect is shown by a coagulation of blood in the vessels of the nervous system. The same inconstancy is seen in other organic extracts. Vasomotor action is important in its effects on the nervous system. There are individual differences in reaction to the extract. No localization of the substance in the spinal cord is observed. The active substance is not in the thymus cells, the cell-free extract being often more active than emulsion of thymus elements. No embolic process is caused by coagulation. In vitro the extract acts as a preventative to coagulation. Specific extracts of other glands such as the suprarenals cause no effect on other nonspecific organs. Section of the vagus and the use of atropin has no influence on the action of the extract. Filtration through a Berkfeld filter stops the coagulation effect of the extract. Slow increase of dose causes tolerance to occur, and later much larger amounts can be taken without any bad effects. Anaphylaxis occurs after suspending the use of the extract. The coagulation intensity is variable, and low grades have no bad effect. Previous use of large doses of hirudin destroys the coagulation effect. Pulse is retarded, often irregular; seldom it is not at all influenced. Respiration becomes slow and deeper; occasionally it is irregular; sometimes it is not at all influenced. Terminal convulsions are probably due to anemia. Thrombosis of the vessels of the medulla as a cause of heart and respiratory changes is unlikely. Autopsy shows ecchymoses of the surface of the lungs in rare cases; they are small and result from the terminal convulsions. Changes in the suprarenals are not found.

Excretion of Phosphates in Infancy.—Study of nineteen cases by J. H. M. Knox and M. Tracy (*Amer. Jour. Dis. Child.*, 1914, vii, 409) confirms the earlier observations that the urinary phosphorous excreted in twenty-four hours by an artificially fed infant is greater than that recorded for the breast-fed child. The data obtained, however, do not justify the conclusion that any deduction as to the nature or severity of the nutritional derangement can be drawn merely from the amount of urinary phosphorus. The estimation of the daily phosphorus excretion from small, single urine samples is unreliable, as the results thus are often at variance with those determined by examination of the twenty-four-hour urine.

Voice Sign in Chorea.—W. B. Swift (*Amer. Jour. Dis. Child.*, 1914, vii, 422) finds that examination of vocal utterance on the kymograph demonstrates a pretty constant voice change of rise in pitch and increase in intensity accompanying choreic movements. The most marked change is in the rendering of the vowel *a* as in *around*. These changes occur so frequently and so constantly accompany the choreic contraction as to give color to the claim that change of pitch and intensity are signs of chorea of equal dignity with the choreic knee jerk of Shaw, and the respiratory signs of Graves.

Osteogenesis Imperfecta.—A. Bookman (*Amer. Jour. Dis. Child.*, 1914, vii, 436) presents a metabolic study of an infant ten weeks of age suffering from this affection. He says of this disease that in active cases the calcium retention is somewhat below or very decidedly below the normal. It is probable that variations in the course of the disease cause changes in the calcium balance. The deficient retention of calcium is apparently influenced favorably by cod liver oil and phosphorus, and still more strongly by calcium lactate.

Acute Bacillus Coli Infection of the Urinary Tract in Children.—R. G. Gordon (*Brit. Jour. Child. Dis.*, 1914, xi, 252) divides these cases into five types: (1) Those cases in which there are only general symptoms. Such symptoms occur somewhat as follows: A sudden onset of the illness associated with rigors or with convulsions, or blueness and collapse. After the onset the temperature rises quickly to 105° or 106° F., and if untreated will continue to swing with large variations, often falling or rising 6° to 8° in a few hours. Sometimes the chart simulates that of typhoid or even malaria, with regular intermissions, but the child is not so ill as the severe fever would seem to indicate, and directly the temperature falls the child is ready to play. The pulse and respirations are usually quickened with the rise of temperature, but are not excessively rapid. The child is pale and drawn, though there may be a flush during pyrexial periods; he is irritable and restless, and he may have marked muscular tenderness. There may be no physical signs, and so nothing to draw attention to the urine. (2) Cerebral cases. These often simulate intracranial disease, especially meningitis, and suffer from delirium, or may be somnolent or even comatose when seen. The onset is often marked by convulsions and there may be rigidity of the neck, strabismus, and rarely Kernig's sign. The extreme irritability and screaming attacks which are often present lend additional weight to the diagnosis of meningitis. (3) Pulmonary cases. Some cases present symptoms suggestive of the onset of pneumonia, having marked tachypnea accompanying the high fever and malaise. As a rule respiratory distress is absent, though cases do occur in which there is some expiratory difficulty. Physical signs are absent, though a slight congestion with impairment of note and occasional *râles* may still further confuse the issue. Such cases do not follow the usual course of a pneumonia, and, what may be taken for the signs of an early consolidation, do not develop. (4) Abdominal cases. The onset in these may be attended by severe colicky pains in the abdomen ascribed by Porter and Fleischner to ulceration of the ureters. There are vomiting and obstinate constipation, or in some cases diarrhea. The appetite is lost early and in a few cases jaundice is seen. With treatment of the urinary condition, the abdominal symptoms disappear. (5) Urinary cases. In these there is often severe pain in the kidney region, usually the right, and the organ itself may be enlarged and palpable, while its size may vary from time to time, as in hydronephrosis. If the kidney substance is involved there may be edema of the face, hands and feet. The bladder symptoms are usually referable to the hyperacidity of the urine, and consist of enuresis, frequency of micturition, straining and pain during the act. Such bladder symptoms, if untreated, may die down for a day or two to reappear again with increased violence. All these various symptoms are doubtless results of the circulation of the toxins produced by the bacilli, and it is noticeable that in most cases they disappear after treatment by alkalies.

Surgical Uses of the Bone-graft.—F. H. Albee's (*Surg., Gyn. and Obst.*, 1914, xviii, 699) paper is based upon an experience gained from 253 human bone-graft cases over a period of three years, and animal experimentation. He says that the endosteum, marrow substance, and periosteum should be included on the graft, as they play a most important rôle in aiding to establish an early and sufficient blood supply from the recipient tissues to the cortical part of the graft. The endosteum is also actively osteogenetic as well as the inner layer of the true periosteum. A rapid and complete union between graft and recipient bone should be in many cases enhanced by the interposition of numerous small grafts in which the periosteum may be disregarded because of the easy access of blood supply to their interior osteoblasts. These coalesce with each other and also with the recipient bones and the large graft. The living bone-graft has certain bacteria-resisting properties, as evidenced by two animal experimental cases where sepsis occurred and parts of each graft became united to the recipient bones, while the rest of the transplant succumbed to the infection and sequestrated. The bone-graft apparently acts always as a stimulus to osteogenesis to the bone into which it is ingrafted or contacted. The bone-graft when well contacted becomes immediately adherent to the recipient bone by newly formed tissue, which changes to solid bone within four weeks' time. This together with its bacteria-resisting property strongly favors, in the author's opinion, the substitution when feasible of the bone-graft in place of all metal internal splints, especially when it is appreciated that metal has the opposite effect to the graft, in that it inhibits callus formation, produces bone absorption, and favors infection.

Use of Living Lactic Acid Bacilli on Diphtheritic Throats.—In spite of their previous lack of success, the recent reports of favorable results obtained by others have stimulated E. V. Goltz and W. D.

Brodie (*Jour. A. M. A.*, 1914, lxii, 1779) to make another and a more detailed attempt, using both the living cultures of lactic acid bacilli and naturally soured milk, in each instance obtaining a control case so far as possible alike. Mulford's (Bulgarian Type) cultures of living bacilli were used, after testing their activity by obtaining growths, on agar-slants. Nose and throat were sprayed two, three and four times daily. No antiseptics were employed and individual atomizers were maintained. The patients receiving the naturally soured milk used this as a gargle and as a nasal douche four and five times daily. The average quarantine period of the six cases reported in which the lactic acid bacillus was used was twenty days. The average quarantine period of the six controlled cases treated locally only with Seiler's solution as a gargle was sixteen days. The average quarantine period of fifty-seven cases admitted to the hospital during January, February and March, 1914, comprising all cases discharged with the required cultures, was twenty-one days. Lactic acid bacilli in the writers' experience hasten the disappearance of diphtheritic membrane, but will not produce cultures negative to the bacillus.

Treatment of Hemorrhagic Disease of the New-born by Direct Transfusion of Blood.—In reporting fourteen personal cases, V. D. Lespinasse (*Jour. A. M .A.*, 1914, lxii, 1866) urges the importance of early transfusion of blood in cases in which there is bleeding from the bowel, because these cases are often quickly fatal, the entire clinical course being only a few hours: The shortest clinical course in his series was four hours from the discovery of the bleeding to the virtual death of the baby. Frequently the babe will nearly bleed to death into the bowel or stomach before any of the blood is passed by rectum or vomited. In the umbilical and purpuric types, the hemorrhages, being external, are discovered earlier, and the loss of blood can be accurately estimated. A hemorrhage of 1 ounce in a new-born baby is equivalent to 1 quart in an adult. Transfusion of live non-clotted blood stops the bleeding at once, replaces the blood lost and gives the baby fresh complement and antibodies to aid it in overcoming any infection that may be present.

Operation for Strangulated Hernia in Infants.—J. B. Barrett (*Med. Press*, July 1, 1914) says that in infants and young children all inguinal herniæ are oblique. A direct hernia is an impossibility. This is of the utmost importance to remember when brought to deal with a strangulated hernia in an infant, because the internal ring must be opened in an outward direction. There cannot be a direct hernia in infancy because the inguinal canal has no length. The external and internal rings are superimposed, almost completely. As the pelvis widens the rings separate until the adult proportions are reached. When the two abdominal openings are almost superimposed, a hernia must pass through both. This being so, the internal ring may be divided in an outward direction without fear of wounding the deep epigastric artery. An immediate operation is necessary in infants in order to avoid the possibility of having to resect a gangrenous portion of intestine, a proceeding usually attended with fatal results in infancy. The importance of a neat and rapid operation is greater in children owing to the danger of post-operative shock, a condition easy to avoid but difficult to treat. The incision should be kept as high as possible. This is best accomplished by having the external half parallel to Poupart's ligament and the internal half horizontal above the level of the penis. It well repays to take the utmost care with the suturing of the skin wound. It is vain to rely on dressings to keep the wound clean, and owing to the habits of infants the edges of the wound should be approximated with the greatest care. If this be done and the incision be made at a high level the chances of rapid healing are increased. The first portion of the operation recommended by the writer, up to the examination and return of the intestine does not differ from that usually performed for adults, with the exception of the method of enlarging the internal ring. When the bowel is returned, the internal oblique and conjoined tendon, and Poupart's ligament are rapidly defined by blunt dissection. A good portion of muscular belly is then united to the full depth of Poupart's ligament, over the sac and its coverings, by usually three medium silk sutures. The skin edges are then rapidly and carefully approximated by fine silkworm gut (preferably a subcuticular suture). The tedious and unnecessary portions of the ordinary operation are omitted. The external oblique in an infant is composed of very feeble and delicate fibres. Their approximation is superfluous. They have no strength, and can offer no resistance. The sac in an infant is an extremely delicate membrane. The ligaturing of the sac is of no avail if the conjoined tendon is not united to Poupart's ligament. If the latter structures are carefully approximated the sac may be left; for no hernia can possibly return, and, furthermore, by this method there can be no damage to the cord or testicle, the shock which is attributed to manipulation of the cord is avoided, and there is a valuable saving of time.

Intramuscular Injections of Antitoxin in the Treatment of Diphtheria.—J. D. Rolleston and C. Macleod (*Brit. Jour. Child. Dis.*, 1914, xi, 289) say that, judging from the literature, the practice of intramuscular injections of diphtheria antitoxin has been confined to German-speaking countries. Their paper is based on six months' experience with this method at the Grove Hospital. In all, 412 injections were given to 399 patients. Subtracting from these 33 still under treatment and 45 found not to have diphtheria, 261 cases of diphtheria received 324 injections. Fifteen died, a mortality of 5.7 per cent., which would be reduced to 4.6 per cent. by excluding 3 cases which died within 24 hours after admission. The severe faucial cases received from 16,000 to 20,000 units on admission, usually the same, but sometimes a smaller dose, being repeated if necessary on one or two of the following days. The moderate faucial cases received from 8000 to 12,000 units on admission, the same dose being occasionally repeated on the following day. The mild faucial cases received from 4000 to 8000 units, and it was rarely found necessary to repeat the dose. The cases of nasal, laryngeal, conjunctival or aural diphtheria in whom there was no faucial involvement, and consequently little, if any, toxemia, received from 4000 to 12,000 units. The total amount of antitoxin given in each case. Intramuscular injection, preferably in the vastus externus, deserves to supersede all other methods of administration of antitoxin in the treatment of diphtheria for the following reasons: It is quite as simple as the subcutaneous method, ensures much more rapid absorption, is less painful, and less liable to give rise to abscesses at the injection site. It is superior to the intravenous method, not only in the greater simplicity of its technique, but also in the less rapid excretion of antitoxin after injection. The more rapid absorption of antitoxin by the intramuscular route is shown, not by the effect on the faucial or laryngeal process, but by the lesser incidence of paralysis, especially of a severe kind.

Salvarsan and Neo-salvarsan in the Treatment of Hereditary Syphilis.—In discussing the question, under what circumstances salvarsan or neo-salvarsan should be employed in the treatment of hereditary syphilis, J. L. Bunch (*Brit. Jour. Child. Dis.*, 1914, xi, 297) says that the drug should be used in those cases where rapidity of action is of prime importance. When the child is so ill that there seems little chance of it surviving, when mercury has already been tried and the child seems to be still sinking, or when mercury has proved inefficient after continued use, inject. Some cases of syphilis prove absolutely resistant to mercury, and often these cases clear up under treatment with neo-salvarsan.

Bacillus of Bovine Tuberculosis as a Factor in Phlyctenular Affections of the Eye.—S. Stephenson (*Lancet*, July 18, 1914) has recently tested twenty children, aged from seventeen months to twelve years, who were suffering from various forms of phlyctenulosis. Von Pirquet's method was adopted. In every case a positive result, both as regards bovine and human tuberculin, was obtained. The intensity of the reaction with the two products varied according to the particular patient. Thus, in one-half of the children the reaction was recorded as equal; in six the bovine exceeded the human reaction; and lastly, in four the reverse was the case. He says that if it can be shown that phlyctenulosis is usually associated with the bacillus of bovine tubercle, then the remedy lies at hand in the shape of a pure milk-supply.

Schick Reaction.—The results of immunizing injections and laboratory experience in testing the blood for antitoxin have shown that only those individuals contract diphtheria who have no antitoxin or only a minute amount in their blood and tissues. Schick has published recently a simple clinical test for estimating antitoxin and thus separating the susceptible from the nonsusceptible individuals. The reaction depends on the local irritant action of minute quantities of diphtheria toxin when injected intracutaneously. If antitoxin is absent, or present only in very small amounts, insufficient for protection, a positive reaction will appear in twenty-four to forty-eight hours. This is characterized by a circumscribed area of redness and slight infiltration which measures from 1 to 2 cm. in diameter. It persists for seven to ten days, and on fading shows superficial scaling and a persistent brownish pigmentation. A pseudo-reaction is found in a small percentage of older children and adults, who may have a large amount of antitoxin. It appears earlier, is more infiltrated, less sharply circumscribed and disappears in twenty-four to forty-eight hours, leaving only a faintly pigmented area which never shows superficial scaling. A standard diphtheria toxin is diluted at first 1 : 10 in 0.5 per cent. phenol; this dilution will keep in the ice-box with little deterioration for at least two weeks. For use further dilutions are made in normal saline, of such strength that 0.1 or 0.2 c.c. contains 1/50 MLD. for the guinea-pig. Schick prefers 0.1 c.c., while W. H. Park, A. Zingher, and H. M. Serota (*Arch. Pediatrics*, July, 1914) prefer 0.2 c.c. This amount is injected intracutaneously on the flexor surface of the arm or forearm. The persistent pigmentation may make the forearm objectionable; in such cases the surface of the arm may be chosen. Though the intensity of the reaction varies in different individuals, a well-marked redness indicates an almost complete absence of antitoxin. Faint reactions point to the presence of very small amounts of antitoxin, which are not sufficient, however, to certainly protect the individual against diphtheria. The Schick reaction was carried out during the past six months on all patients entering the scarlet-fever pavilion of the Willard Parker Hospital—700 patients. Of these 400, or 57 per cent., gave negative reactions. Only cases giving positive reactions were immunized; those giving negative reactions were carefully observed. Although more than a quarter of the negatively reacting patients became bacillus carriers while in the wards, no cases of clinical diphtheria developed among them. The remaining 300 patients who gave positive reactions received in practically all cases some form of toxin-antitoxin mixture. Among those who reacted insufficiently to the attempt at active immunization with toxin-antitoxin mixtures, forty-two developed clinical diphtheria. Thus the Schick reaction served as a reliable and convenient index of the susceptibility or nonsusceptibility of individuals to diphtheria. It served, also, as an accurate clinical test to determine the efficiency of active immunization with mixtures of diphtheria toxin and antitoxin. It has helped the writers in the diagnosis of clinically doubtful nasal diphtheria. With a purulent or sanious discharge showing the Klebs-Loeffler bacillus it is difficult to decide whether the case is a carrier or a beginning diphtheria. A negative reaction excluded clinical diphtheria, while a positive Schick reaction left the diagnosis of clinical diphtheria still a probability. It has added further experimental proof to the clinical experience that very toxic cases of diphtheria require the early intravenous administration of large doses of antitoxin. The results obtained in families seem to point to other causes in addition to bacterial infections with virulent diphtheria bacilli as determining factors in the production of natural antitoxin. During systematic testing of groups of children belonging to one family, the authors were impressed with the frequency with which all the children of the same family gave a similar reaction. If variations were found, the younger children always gave the positive reactions. If the youngest child had a negative reaction all the older children were also negative. On the other hand, if the oldest child in a family gave a positive reaction, the younger children always showed positive reactions.

Finkelstein's Foundations.—In a review of articles appearing in *Jahrbuch für Kinderheilkunde*, Bd. lxv–lxviii, F. N. Wilson (*Arch. Pediatrics*, July, 1914) sums up the theory of alimentary decomposition as follows: As a result of unsuitable food a nutritional disturbance develops, which consists in a material injury to the bodily condition as a whole, but especially to those tissues concerned in nutrition. This injury gives rise to a weakening of the nutritional function, the principal symptom of which is a reduction of the tolerance for food. Upon this as a basis the physiological reaction to food changes to an abnormal paradoxical reaction. The further the disturbance has progressed from the normal the smaller the amount necessary to continue the reaction. In the beginning of this process the child loses only the ability to make use of the food in the perfect way in which the normal child does for the repair and growth of its tissues, while he is still able to protect himself from losses and catastrophes. There follows simply a lessened end result of the nutritional process. This is balance disturbance. This condition persists until again under the influence of unsuitable food, the signs of a severe local disturbance in the intestinal tube arise. This is dyspepsia. If favorable influences do not stop the progress of the illness, and bring about convalescence, general disturbances aside from the local ones appear and an important change occurs in the character of the illness which presents a reversal of the nutritional process in the true sense. Instead of the organism receiving energy and material for repair and growth from the food, the food destroys the body. The destruction proceeds more rapidly the more one tries to check it by the giving of food, and severe emaciation occurs. The most important component of the food that may act in this way is first the fat and second the carbohydrates. The nitrogenous part of the food seems to have little influence on the condition. What the body loses during its downward course is not alone the relatively unimportant, easily replacable substance like fat and water, but it seems likely that the food also robs it of important biological materials, which are essential for the normal activity of the nutritional process and which cannot be very much diminished without risk to life. For only in this way is it possible to explain that hand in hand with the emaciation there is a constant decrease in the assimilative power which makes the feeding of the child a greater and greater task until it becomes absolutely unnourishable. This material and functional exhaustion is alimentary decomposition. The most characteristic and important sign of decomposition is the progressive diminution of the tolerance for food. This gradually extends to all kinds of food and food constituents, but to fat and sugar especially and while fat acts only toward the production of decomposition, even when the tolerance for it is widely exceeded, the action of the sugar is manifold. It not only helps in the production of decomposition, but when the tolerance for it is widely exceeded it is also capable of producing fever and toxemia. The toxemia and fever which appear to follow fat are really due to sugar and arise because the fat causes an acute lowering of the sugar tolerance. Alimentary intoxication is really only the paradoxical reaction of a case of decomposition toward an amount of sugar in excess of its tolerance. Dyspepsia, which stands on the threshold of decomposition by injury to the intestinal wall, makes it possible for sugar to act pathologically beyond it; decomposition itself by its progressive reduction of tolerance for fat and sugar increases the sensitiveness of the organism still further and increases the liability and the danger from toxic accidents.

Factors of Safety in Cleft-palate Surgery.—J. R. Eastman (*Lancet*, Aug. 1, 1914) says that in the Langenbeck or similar flap operations there will be much less likelihood of separation of the wound margins if the mattress coaptation sutures, after being reinforced by a simple running suture, are further supported by a continuous relaxation suture passing around the free edge of the palatine arch, following the course of the palato-glossus muscle. The immobilizing suture may be introduced as a series of knotted loops or as a running button-hole suture. The former is the more secure. The knotted suture is introduced by passing a small curved needle bearing the long thread of fine celloidin linen or von Brun's hemp through the edge of the anterior palatine arch on one side near its base—that is, near the side of the tongue. The thread is drawn through to its middle and secured with a reef knot leaving the tail of the suture long. At a distance of 3 or 4 mm. from the first or outermost knot the needle is again passed through the edge of the arch; the tail of the suture is taken up and another reef knot tied. This process is continued around the anterior palatine arch to its base on its opposite side, the suture crossing in front of the base of the uvula. Elimination of the general anesthetic and employment of local anesthesia remove many of the dangers of palate surgery and add greatly to its simplicity. If adrenalin be added to a solution of novocaine the technical difficulties are diminished as hemorrhage becomes negligible. Local anesthesia protects against shock not only by minimizing hemorrhage but also by acting as a nerve-block. In extensive operations the swallowing of more or less blood is almost unavoidable. The presence of this blood in the stomach of an infant or small child is not infrequently productive of serious metabolic disturbances. The absorption of the pyogenic constituents of a large quantity of blood quickly induces a high fever. Prompt removal of the blood from the stomach of the infant by lavage militates strongly against the development of the fever. The introduction of a medium-sized male catheter and thorough rinsing of the stomach, if done promptly after palate operations, will therefore remove an element of danger. Failure to choose the proper operation for the specific case is more often culpable for failure than any of the other recognized causes of failure. In cases of high palatal arch if the cleft be not too wide, it is useless to make paralyzing incisions for the relief of tension, for the two halves of the loosened muscoperiosteal palate will fall together like the two halves of a cantilever drawbridge, and may be sutured without tension if the soft palate be quite completely separated from the hard palate at the posterior border of the latter. In cases in which the hard palate is almost horizontal, with associated widening of the alveolar arch, the compression method advocated by Brophy is not to be disregarded provided the case is seen during the first few months. Surgeons who make a rule to operate in the second or third year will have a lower mortality rate than those who operate early. Only the strongest survive the two or three years without early operation; the late operations are, therefore, good surgical risks. How large a percentage of those which are not operated upon early perish from disturbances of nutrition before the third year it would be difficult to estimate. It may safely be conjectured that the percentage is high. Many of such can be saved by early operation.

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ORIGINAL COMMUNICATIONS

THE PHYSIOLOGY AND PHARMACOLOGY OF THE EXCISED HUMAN UTERUS.

BY

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(With fourteen charts.)

At a recent demonstration before the Sloane Alumni Association,* I illustrated the pharmacodynamics of some ecbolic drugs, using as a test object the isolated uterus of the guinea-pig. From the effects on this organ certain broad conclusions were drawn as to the actions of these drugs on the human uterus and suggestions were made as to their use in obstetrics and gynecology.

Some of the guests of the Association questioned the propriety of applying to the human uterus conclusions based on a study of the uterus of the guinea-pig because of the anatomical and physiological differences between the two organs. Anatomically the guinea-pig uterus is practically a simple tube composed of two well-defined layers of smooth muscular tissue, an inner circular and an outer longitudinal plane. The human uterus, on the other hand, consists of at least three ill-defined strata of muscle fibers. Of these, the two external coats correspond to the two layers found in the guinea-pig. The innermost layer, which forms the greater part of the thickness of the uterine wall, is a much hypertrophied muscularis mucosæ. The human Fallopian tube, with its two muscular layers, corresponds more closely to the uterus of the guinea-pig.

Other objections were based on the physical differences between

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the human uterus and that of the guinea-pig. It was said that the movements of the isolated guinea-pig uterus might be secondary to the stimulation set up by an anisotonic Ringer's solution and that their presence in an extirpated uterus did not afford conclusive evidence that they were a normal function of the uterus *in situ.* Furthermore, it was claimed that the human uterus is quiescent except during pregnancy and menstruation. These differences, developmental and functional, were said to be sufficient to invalidate my deductions.

These criticisms have led me to investigate the physiology and pharmacology of the surviving human uterus and tubes.

PART I.—PHYSIOLOGY OF THE HUMAN UTERUS.

Before considering the excised organ, it will be advisable to discuss the results reported by those who have studied the movements of the human uterus *in situ.*

It is generally admitted that the expulsion of the fetus is due in large part to the rhythmical contractions of the uterus. Does the uterus acquire new motor functions during pregnancy or are the contractions physiological exaggerations of rhythmical movements that occur in the virgin organ?

During the course of an ordinary laparotomy, the human uterus, tubes, vagina, etc., are quiescent—that is, no spontaneous movements are seen. This holds true regardless of the condition of the uterus, whether virgin, pregnant,* or postpartum. It cannot be argued from this that the unexcised uterus is always at rest. We know that under normal conditions intestinal peristalsis is always going on, but when the abdomen is opened true peristalsis immediately ceases. Meltzer(1) explains this phenomenon as due to an inhibition, which he likens to the hush which falls on a conversation when the door to the room is unexpectedly opened.

It is a well-known fact, however, that if the body of an animal be submerged in saline and the abdomen then opened there is no interruption of the uterine movements(2) nor of intestinal peristalsis(3). Such an experiment has been interpreted to indicate that exposure to the air, and the consequent rapid loss of CO_2, leads to the cessation of the contractions(4).

It seems probable that whatever explanation is accepted to account for the inhibition of the intestine can also explain the absence of uterine peristalsis.

Although usually the contractions of the human uterus *in situ* are

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* Except during labor.

observed only during labor, Dr. Taylor says that not infrequently they may be felt distinctly in the course of a gynecological examination. It can be shown that the mechanical factors involved in such an examination—the finger in the vagina and the hand palpating the fundus—are not likely to account for the movements.

The contractions of the nonpregnant human uterus were first graphically recorded by Henricius(5). He inserted into the cavity of the uterus a small metal catheter, to the inner end of which was attached a small thin-walled balloon. The end of the catheter projecting from the vagina was connected with a manometer. The balloon was distended with water and the excursions of the manometer were graphically recorded. The tracing showed three distinct types of waves:

1. Small oscillations synchronous with the heart beat;

2. Large excursions, caused by the ascent and descent of the uterus during respiration;

3. Large flat waves due to the contractions of the uterus. Because these remained unchanged for hours, Henricius concluded that they were not secondary to the reflex induced by the catheter, but indicated that rhythmic contraction is a normal function of the human uterus.

More recently, Kehrer(6), using a somewhat similar method, has registered the movements of the pregnant and postpartum uterus. He describes three types of uterine contractions:

1. Pendulum movements, corresponding to those of the intestine, which he believes are present in the tubes and ligaments as well as in the body of the uterus;
2. Tonus waves or variations in tonus;
3. Contractions.
    - *a.* True peristalsis. Though these movements have never been seen in the living subject Kehrer believes their presence must be assumed to account for the discharge of menstrual blood, foreign bodies, etc.
    - *b.* Antiperistaltic waves. These are very important and explain the infection which occurs after the introduction of toxic substances into the vagina.
    - *c.* Simultaneous and rhythmic contractions of the whole uterus. They occur especially in pregnancy.
    - *d.* Stricture: a localized tetanus which occurs only at the sphincters at the tubouterine junction and at the internal os.
    - *e.* Tetanus: a continuous contraction of the whole uterus.

The last two types are always pathological.

Kehrer(7) was the first investigator to study the movements of the isolated human uterus. His specimens were obtained from the operating-room. He describes the movements as being very powerful, sluggish, long-continued contractions alternating with strikingly long pauses.

The papers of Rübsamen and Kligerman(8), Franz (9), Neu(10), and Gunn(11), deal chiefly with the effects of drugs on the human exsected uterus.

The present investigation has to do only with the isolated human uterus and tubes. The material was obtained from the operating rooms of the Sloane Hospital for Women and of the Gynecological Division of the Roosevelt Hospital. It is with great pleasure that I acknowledge my indebtedness to Professor E. B. Cragin and to Professor H. C. Taylor for supplying me with the specimens.

METHOD.

As soon as the organs had been excised segments, were cut from them and transferred to a large jar containing 500 c.c. of oxygenated Ringer's solution. If the specimen was to be studied immediately the temperature of the solution was maintained at 38° C.; if the tissues were to be reserved for later experiments, they were at once immersed in Ringer's solution at 5° C. to 10° C. and immediately placed in the ice-chest. Here the temperature was approximately 5° C. At least once in twenty-four hours the tissues were transferred to freshly prepared oxygenated Ringer's solution. That such treatment is not deleterious to contractile tissue has been shown by Gunn(12) for the heart and by Herz(13) for the intestine. I have preserved guinea-pig uteri for 196 hours at such low temperatures, and at the end of this period suspended the uteri in warm Ringer's fluid. The movements though weaker were almost identical in type with those made by the segment immediately after its removal from the body of the animal.

In his study of the isolated human uterus, Kehrer(7) recorded spontaneous contractions twelve hours after extirpation. He believes that after the lapse of fourteen to sixteen hours these spontaneous movements of the uterus are lost. I have found that if special precautions are taken the rhythmic contractions are preserved for much longer periods.

If the tissues are kept at low temperatures, in order to inhibit as far as possible their metabolism, and if they are supplied with abundant oxygen and glucose, they show, when suspended in warm Ringer's solution, well-marked spontaneous contractions 105 hours after operation. Later than this no spontaneous movements have occurred, although the reaction of the fibers to barium chloride indicated that they had retained their contractility 127 hours after operation.

For the study of uterine tissue a small segment was excised from the gross specimen, care being taken to make the cuts parallel with the direction of the muscle fibers. Nearly all the experiments were carried out on the longitudinally disposed outer layer, the segments being taken from the anterior or vesical surface of the uterus near the fundus. The presence of two well-defined layers of smooth muscle in the tubes made it possible to study the longitudinal as well as the circular fibers. The strip of uterine muscle or the segment of a tube having been excised was prepared in the manner described in a previous article.* That is, the tissue was suspended in a cylinder containing warm oxygenated Ringer's solution. The movements of the muscle were recorded by a lever of the first order on the smoked paper of a slowly turning kymograph. The upstrokes in the accompanying charts represent contractions, the downstrokes relaxations of the uterus.

UTERINE MOVEMENTS.

Nonpregnant Uterus.—The contractions of the external coat are slow but powerful. There is a considerable variation in the completeness of the individual contractions as well as in the extent of the relaxation. The movements may be regular in their rhythm or the intervals between successive contractions may differ greatly. Usually the contraction is followed promptly by a relaxation but sometimes the fibers remain contracted for a considerable period. In some tracings the rate of the movements is very slow. This is due to the long pause which intervenes between successive cycles. The external longitudinal coat contracts at the rate of ten to sixty per hour.

The development of the movements when the experiment has been set up is interesting. If the tissues have been kept for some time at 5° C. and then gradually warmed to 38° C. 40° C., there is a progressive loss of tonus for from twenty to sixty minutes. During this interval spontaneous contractions may be entirely absent or there may be a few feeble movements. Then quite suddenly there is an enormous increase in tonus and spontaneous contractions make

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* AMER. JOURN. OBST. AND DIS. WOMEN AND CHILDREN, 1914, lxix, No. 1.

their first appearance or they become larger than they were during the stage of low tonus. The contractions having once begun continue for hours with comparatively little change in rate or strength. The level of tonus, however, is subject to considerable variation, the exact explanation of which is not at hand. It is not due to temperature changes nor to the accumulation of metabolites in the surrounding saline fluid, nor to changes in the composition of the Ringer's solution.

Parturient Uterus.—The movements of the external longitudinal coat are of two types. In the first they are simple waves. The contractions and relaxations usually begin and end slowly so that the summits of the waves and the valleys between them are rounded. In this type there is but little change in tonus.

In the second type, there are large coarse waves on which are superimposed smaller contractions. The latter correspond to the waves of type 1, while the coarser waves are probably manifestations of changes of tonus analogous to the "Tonusschwankungen" which Magnus(14) discusses in connection with the isolated intestine. The rate of the small contractions is subject to considerable variation, but it is probably not far from sixty to seventy-five an hour.

In the one case in which the movements of the oblique fibers of the middle coat were recorded, the waves corresponded to type 1.

MOVEMENTS OF THE FALLOPIAN TUBES.

Nonpregnant.—Longitudinal fibers. These fibers have a much faster rate of contraction than those of the body of the uterus. In the nonpregnant tubes the rate has been found to vary between 120 and 200 per hour. The contractions are usually small, the height varying inversely to the rate. They may be quite regular in rhythm and strength, so that one contraction wave is almost the exact counterpart of any other. Occasionally there is an ill-defined tonus wave on which the small contractions are superimposed.

Circular fibers. The movements of the inner layer of muscle resemble closely those of the outer layer. In one case the trace resembled Cheyne-Stokes respiration, with rhythmical increase and decrease in the extent of the excursion, a period of quiescence separating each phase.

*Parturient Tubes.**—With pregnancy the contractions of the tubes assume a new character. The movements of both the circular and

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* Throughout this article the term "parturient tube" is used to indicate the tube removed with a parturient uterus. The tube itself did not contain the fetus.

the longitudinal fibers become slower but much stronger. The tonus changes become very pronounced. Usually the ascending limb of the curve is smooth and unbroken, but the descending limb is interrupted by numerous small contractions. Not infrequently one contraction follows another without marked pause. Occasionally the individual contractions are separated by strikingly long periods of inactivity during which the tube remains in extreme relaxation.

THE ORIGIN OF THE UTERINE MOVEMENTS.

From the above experiments it is clear that the uterus and the tubes contract and relax rhythmically when completely separated from the central nervous system. The impulses which lead to the contractions cannot, therefore, be generated within the cerebrospinal axis. Nevertheless, the movements may be influenced by nervous impulses arising within the central nervous system. Thus, a psychic shock may lead to the onset of labor. On the other hand, the allaying of mental anxiety often results in the cessation of labor pains.

The uterine movements are not secondary to impulses derived from the large nerve plexuses in the immediate neighborhood. Neither the ovarian, the uterine, nor the vaginal plexus is essential for the automatic movements, inasmuch as strips of muscle of the middle coat, which is remote from these plexuses, show spontaneous contractions. Since the plexuses are anatomically connected with all the pelvic organs they are probably intimately concerned with the local reflex effects upon the uterus.

Inasmuch as the movements are not due to impulses derived from the central nervous system nor from the adjoining nerve plexuses, they must originate within the organ itself. They may be due to an inherent rhythmic function of the muscle cells themselves, or they may be the result of impulses formed in the nerve cells found within the walls of the tubes and uterus. Each of these views has its supporters.

The absence of a well-defined nerve plexus corresponding to Auerbach's plexus in the wall of the intestine, leads me to believe that the stimuli arise within the muscle fibers. It is improbable that the ganglia, scattered as they are along the course of the nerve fibers, are able to generate impulses which lead to coördinate contractions of the entire uterus. Further discussion of the origin of the movements is reserved for a subsequent communication.

I have shown that the tubes contract more rapidly than the body of the uterus itself. This suggests the possibility that the contraction wave begins in the tube, sweeps over it, and finally involves the uterus proper. There is an orderly progression of the contraction wave, much as is found in the heart. Like the ventricle, the uterus possesses its own inherent rhythm, which is slower than that of the tubes and is ordinarily in abeyance. When impulses fail to reach the uterus from above, it contracts according to its own rhythm, resembling under these circumstances the ventricle in heart-block.

PART II.—PHARMACOLOGY OF THE HUMAN UTERUS.

EPINEPHRINE.

The response of the human uterus and tubes to epinephrine is of great physiological and therapeutic importance. It has been shown by Elliott(15) that epinephrine stimulates the myoneural junctions of the true sympathetic system and that the response of any organ simulates in all respects electrical excitation of its sympathetic nerves. The response may be either inhibitory or motor. Thus the movements of the small intestine are inhibited by sympathetic stimulation and by epinephrine. Both of these procedures induce spasm of the ileo-colic sphincter. The effect of sympathetic stimulation and of epinephrine on the uteri of the lower animals may be recalled.

Langley and Anderson(16) have shown that the sympathetic nerve supply to the uterus of the rabbit is always motor. Whether the uterus is pregnant or not stimulation of its sympathetic nerves invariably causes an increase in the activity of the organ. Epinephrine produces a similar effect.

On the other hand, Cushny(2), Dale(17), and Kehrer(7) discovered independently that the response of the cat's uterus varies with its functional condition. The nonpregnant organ is inhibited by sympathetic stimulation and by epinephrine; the pregnant uterus is thrown into increased activity.

Gunn and Gunn(18) have shown that sympathetic stimulation and epinephrine inhibit the uteri of rats and of guinea-pigs regardless of the physiological state of the organ.

The importance of the innervation of the human uterus now becomes apparent. Is the sympathetic nerve supply to the uterus motor or inhibitory? Is its influence modified during pregnancy? If it is inhibitory in character, the employment of epinephrine during labor or in postpartum hemorrhage is dangerous for it will lead to relaxation and inhibition of the uterus.

Fig. 1 shows the effect of epinephrine on the non-pregnant isolated human uterus. At *E* sufficient epinephrine was added to make a 1 : 2,000,000 solution. At once the uterus contracted powerfully and there was a great increase in the rate of the movements. The tonus was markedly increased. These effects were of comparatively short duration, probably because of the conversion of the epinephrine into a less active oxidation product. Fig. 2 illustrates the action on a parturient tube. The effect on the rhythm was particularly striking. The evanescence of the action was again apparent. On replacing the epinephrine with fresh Ringer's solution the normal rhythm was at once regained.

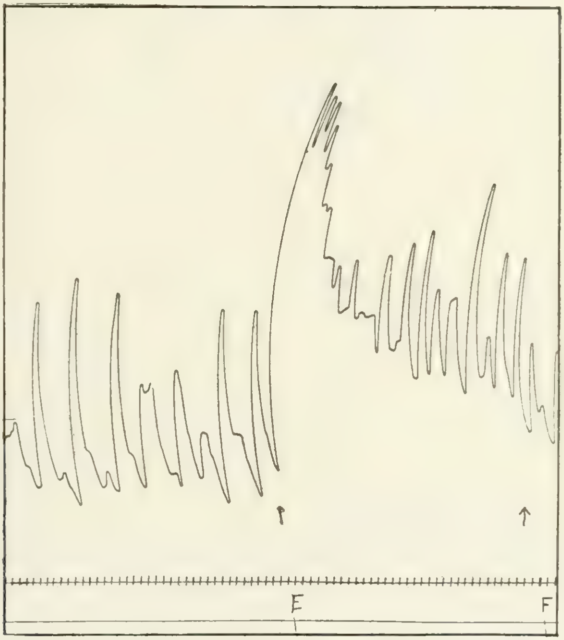

FIG. 1—Human uterus, non-pregnant; longitudinal fibers from external coat. Four hours after operation. Strip 3 × 0.5 × 0.5 cm. Load one gramme. Magnification 13.3 (all figures reduced 1/2). Temperature 39° C. At *E*, epinephrine to make 1:2,000,000.

From these and other experiments the conclusion is probably justified that the sympathetic innervation of the human uterus is always motor in quality.

The beneficial effects of an epinephrine douche during postpartum hemorrhage can now be explained. In addition to the constriction of the bleeding vessels, epinephrine produces a contraction of the uterus itself. Thus the flow of blood to the ruptured vessels is diminished and the hemorrhage stops. The effect on the uterine muscle is probably at least as important as that on the vessels.

The question arises, Can postpartum hemorrhage be controlled by the systemic administration of epinephrine? Probably not. When the drug is administered by mouth, subcutaneously, or intramuscularly, the absorption is so slow and oxidation at the point of application so rapid that but little of the drug enters the circulation. The intravenous administration would undeniably produce a marked stimulation of the uterus but the sudden rise in blood pressure and the redistribution of the blood would more than counterbalance this effect and the hemorrhage would be increased.

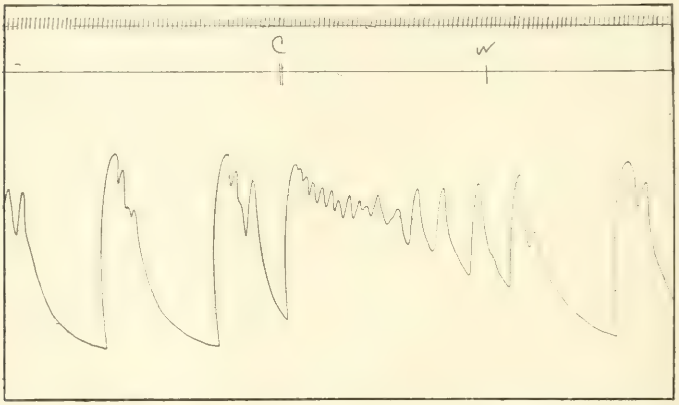

Fig. 2.—Human tube, parturient, circular fibers. Forty-eight hours after operation. Strip 4.5 × 0.25 × 0.25 cm. Load $1\frac{1}{2}$ gm. Magnification 4. Temperature 37° C. At *C*, epinephrine to make 1:200,000. At *W*, fresh Ringer's solution.

Nor should epinephrine be used as an ecbolic. The intravenous administration would probably be dangerous and the other methods of administering the drug would be worthless(19).

ERGOTOXINE.

Barger and Dale(20) have shown that the pharmacologic action of ergot can be ascribed to at least three active constituents. Of these ergotoxine is an alkaloid specific to ergot. Fig. 3 illustrates the effect of this drug on the longitudinal muscle fibers of a parturient uterus. Two and five-tenths milligrams of the alkaloid were added at the point indicated by the arrow. After a latent period of about a minute the uterus contracted powerfully and passed into very high tonus. There was a suggestion of tetanus, soon broken through, however, by numerous contractions. The rate of these waves was approximately twice the normal. The effect was extremely persistent and despite repeated washing was still present at the end of seventy-five minutes.

This marked stimulation of the isolated uterus is interesting in view of the fact that neither Kehrer(19) nor Gordon Sharp(21) was able to show that ergotoxine influenced the strength of labor pains. This disparity between the action of ergotoxine on the uterus *in situ* and on the exsected organ is at once explained when the relative doses are considered. The amount advised as an ecbolic is 1/100 of a grain, but Kehrer employed as much as 2/65 of a grain (2 mg.) in a single dose. Assuming that the average patient weighs 140 pounds and that one-twentieth of her body weight is blood, the concentration of ergotoxine in her plasma would be far less than 1 to 3 to 5,000,000. Such dilute concentrations are without effect on the isolated uterus, the threshold value being in the neighborhood of 1:1,000,000. In the experiment cited above the proportion was 125:5,000,000, a dose which could not be safely administered to parturient women.

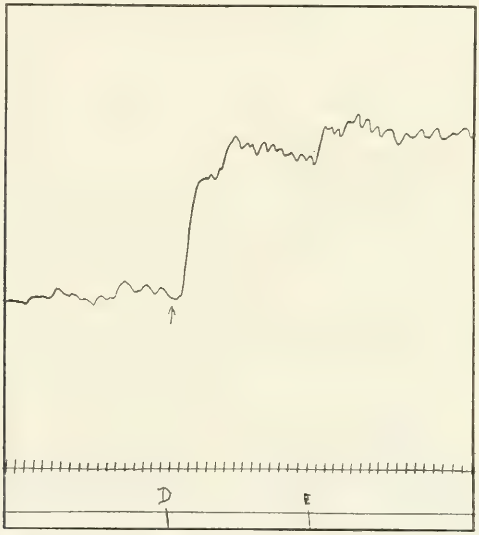

FIG. 3.—Human uterus, parturient, longitudinal fibers of external coat. Ten and one-half hours after operation. Strip 12 × 0.5 × 0.5 cm. Load 0.5 gm. Magnification 4. Temperature 40° C. At *D*, ergotoxine to make 2.5:100,000.

PARA-HYDROXYPHENYLETHYLAMINE.

Para-hydroxyphenylethylamine, one of the amines present in ergot, is closely related chemically to epinephrine. Like this leucomaine, para-hydroxyphenylethylamine simulates in its action stimulation of the true sympathetic nervous system.

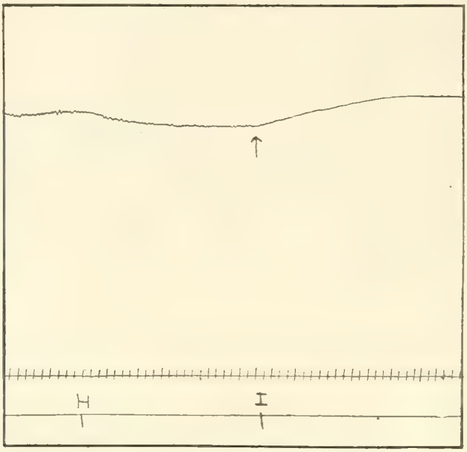

FIG. 4.—Human uterus, non-pregnant, longitudinal fibers. Seventy-six hours after operation. Segment 3 cm. long. Load 0.3 gm. Magnification 7. Temperature 39.5° C. At *I*, para-hydroxyphenylethylamine to make 20:100,000.

Fig. 4 illustrates the effect of adding 20 mg. of para-hydroxyphenylethylamine to the Ringer's solution in which a nonpregnant uterus was beating rhythmically. The trace is a record of the move-

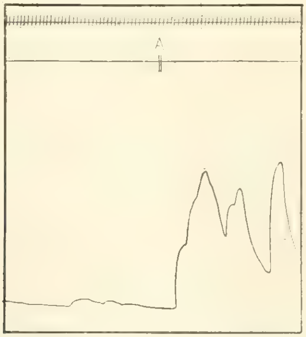

FIG. 5.—Human tube, parturient, circular fibers. Forty-eight hours after operation. Strip 4.5 × 0.25 × 0.25 cm. Load $1\frac{1}{2}$ gm. Magnification 4. Temperature 37° C. At *A*, para-hydroxyphenylethylamine to make 5:100,000.

ments of the longitudinal fibers of a specimen which had been removed from the patient twenty-six hours previously. The normal contractions were small but quite regular and the tonus was fairly constant. As soon as the para-hydroxyphenylethylamine was added the contractions were gradually lost and the uterus passed into a well-defined tetanus. This effect was persistent, and repeated washing of the preparation did not remove the tetanus nor cause rhythmic contractions to appear.

The response of the parturient uterus is shown in Fig. 6. At the first arrow 5 mg. of para-hydroxyphenylethylamine were added. Almost at once there was a marked increase in tonus, but neither the rate nor the strength of the contractions was much affected.

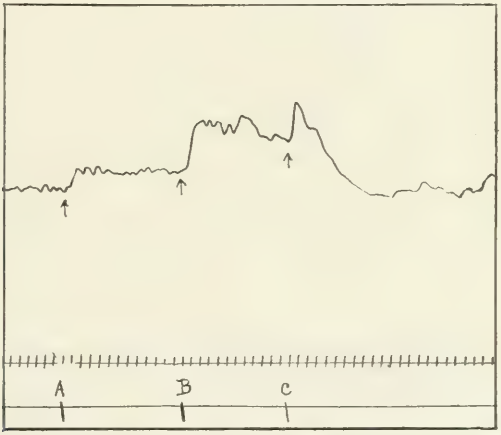

Fig. 6.—Human uterus, parturient, longitudinal fibers of external coat. Ten hours after operation. Strip 12 × 0.5 × 0.5 cm. Load ½ gm. Magnification 4. Temperature 40° C. At *A*, para-hydroxyphenylethylamine to make 5:100,000. At *B*, the same to make 10:100,000. At *C*, fresh Ringer's solution.

At the second arrow para-hydroxyphenylethylamine was again added in like amount and caused a further increase in tonus. When the drug-containing solution was replaced by fresh Ringer's solution the stimulating effect of the para-hydroxyphenylethylamine was promptly removed.

BETA-IMIDOAZOLYETHYLAMINE.

A third active constituent of ergot is beta-imidoazolyethylamine. Fig. 7 is a reproduction of a tracing made by the longitudinal coat of a parturient tube. At *D*, 0.1 mg. of beta-imidoazolyethylamine was added. At once the tube was thrown into increased activity.

The tonus was enormously raised, each contraction was more complete than normal and the relaxations became very imperfect. The rate of the individual contractions was well above the normal. The stimulation wore off gradually despite the continued presence of the drug in the surrounding medium. At *W* the preparation was washed and the normal rhythm and tonus were soon recovered.

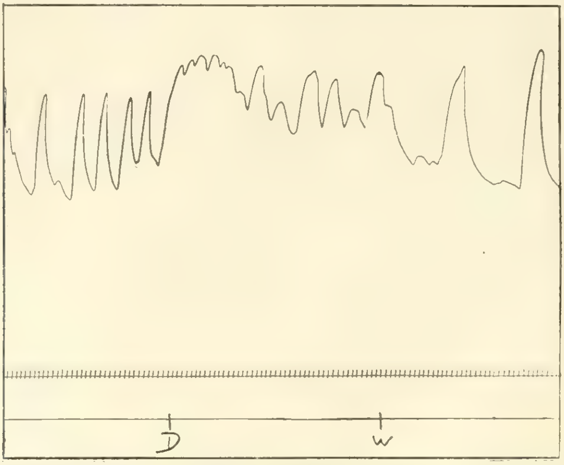

FIG. 7.—Human tube, parturient longitudinal fibers. Twenty-nine hours after operation. Strip 4 × 0.5 × 0.5 cm. Load 2.5 gm. Magnification 2. Temperature 39° C. At *D*, beta-imidoazolylethylamine to make 1:1.000,000.

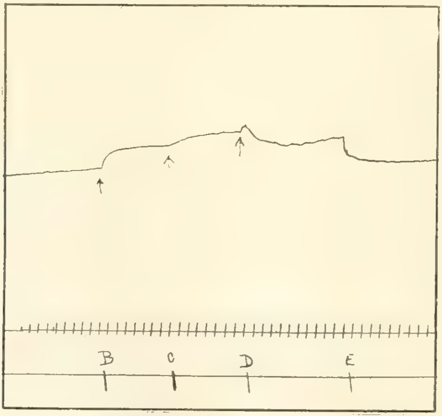

FIG. 8.—Human uterus, parturient, longitudinal fibers of external coat. Eight hours after operation. Strip 6 × 0.5 × 0.3 cm. Load 1.5 gm. Magnification 2. Temperature 39.5° C. At *B*, beta-imidoazolylethylamine to make 1:200,000. At *C*, the same to make 1 : 100,000. At *D–E*, fresh Ringer's solution.

The effect on the parturient uterus may be seen in Fig. 8. At *B* and again at *C*, 0.5 mg. of beta-imidoazolyethylamine were run into the chamber. At each addition there was an increase in tonus, more marked after the first. There was a distinct tendency for the feeble spontaneous contractions to pass into a tetanus. Here too the effect was promptly removed when the beta-imidoazolyethylamine was replaced by fresh Ringer's solution (*D*).

That the non-pregnant tube also reacts to beta-imidoazolyethylamine is shown in Fig. 9. At *C*, 1 mg. of beta-imidoazolyethylamine was introduced into the cylinder. The longitudinal fibers passed into a well-defined but transitory tetanus which was soon replaced by contractions in heightened tonus. Neither the rate nor the extent of the individual contractions was materially changed.

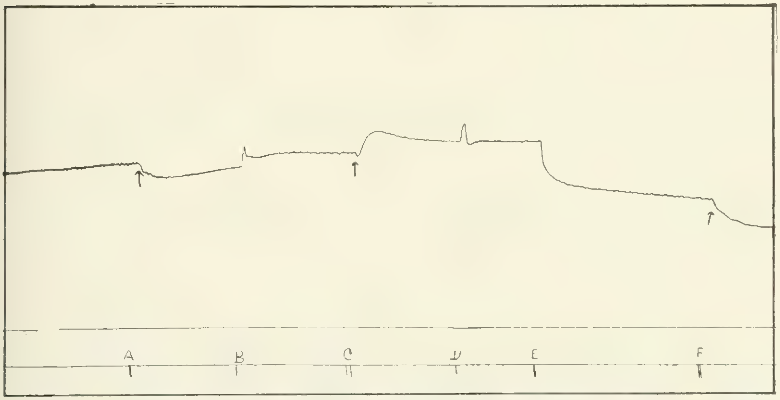

FIG. 9.—Human tube, non-pregnant, longitudinal fibers. One hour after operation. Segment 2.5 cm. long. Load 1 gm. Magnification 4. Temperature 39° C. At *A*, pituitary to make 1:100. *B*, fresh Ringer's solution. *C*, beta-imidoazolylethylamine to make 1:100,000. *D*, fresh Ringer's solution. *E*, load doubled to equal 2 gm. *F*, pituitary to make 1:100.

ERGOT.

The effect of fluid extract of ergot on the isolated uterus and tubes has been, on the whole, disappointing. A number of different samples have been tried, usually after distilling off the alcohol and replacing it with Ringer's solution. This manipulation was necessary because the addition of alcohol to the isolated uterus results in a more or less marked depression.

Usually the stimulating effect of fluid extracts of ergot has been slight or absent. At *C* in Fig. 10, 0.1 c.c. of an old preparation was added to the 100 c.c. of Ringer's solution in which a strip of parturient uterus was contracting. There occurred a very slight increase in tonus but a considerable augmentation of the rate and strength of the individual movements. The fluid extract used in this experiment had been in the laboratory for nearly two years and very probably had lost much of its activity. An artificial fluid extract had a similar but more striking effect.

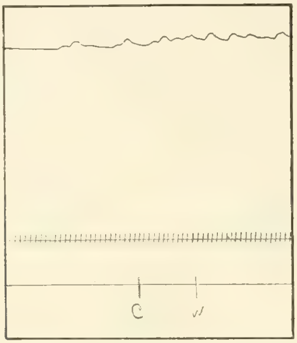

FIG. 10.—Human uterus, parturient, oblique fibers from the middle coat. Four hours after operation. Load 0.5 gm. Magnification 2. Temperature 40° C. At *C*, fluid extract of ergot to make 1:1,000.

PITUITARY EXTRACT.

It is claimed that an extract of the posterior lobe of the pituitary gland is the ecbolic par excellence. Administered during labor it stimulates the muscle fibers of the uterus, increasing the frequency and the strength of the contractions.

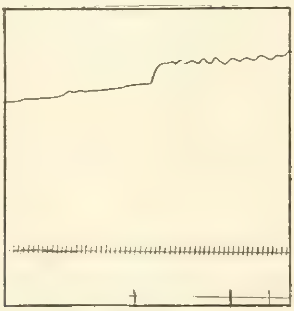

FIG. 11.—Human uterus, parturient, oblique fibers from middle coat. One hour after operation. Strip 2 × 1 × 1 cm. Load 5 gm. Magnification 2. Temperature 40° C. At *A*, pituitary to make 1:950.

The same increase in activity is produced by pituitary on a strip of muscle from a parturient uterus or tube. The curve in Fig. 11 was made by the oblique fibers of a uterus removed by Cæsarean section. The normal contractions were feeble and very slow. On the addition of pituitary at *A* these movements became stronger and very much more rapid; the tonus was greatly increased. This stimulation was very persistent and was not easily removed even by repeated washing with fresh Ringer's solution. In only one instance did pituitary cause even a transitory tetanus. In that experiment a very large dose was added, sufficient to make 1:100. This absence of tetanus has been repeatedly mentioned in the reports of the clinical use of pituitary.

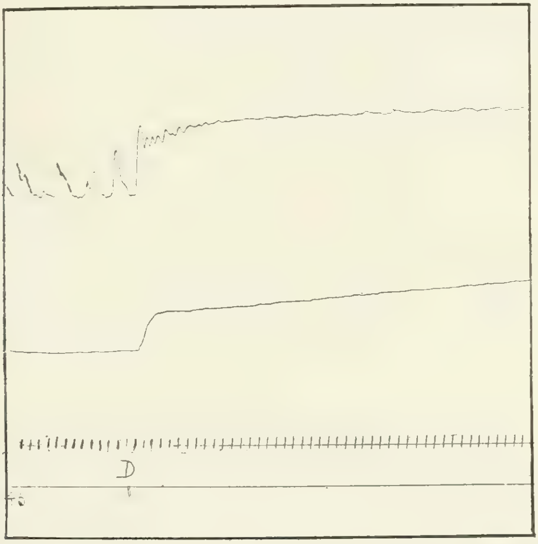

FIG. 12.—Tubal pregnancy. Upper tracing, longitudinal fibers of tube just peripheral to sac. Lower tracing, longitudinal fibers of sac. Load 0.6 gm. Magnification 13. Temperature 39° C. At *D*, pituitary to make 1:50.

Fig. 12 illustrates the effect of pituitary on the ectopic tube. The specimen was kindly supplied by Professor F. S. Mathews. The pregnancy was of about six weeks' duration and symptoms had been present for three days before admission to St. Luke's Hospital. The upper tracing was made by the longitudinal fibers of a segment of the tube just peripheral to the sac. The lower record was written by the longitudinal fibers of the sac itself. At *D*, 0.3 c.c. of pituitary extract was added to each cylinder, making a concentration of 1:50. The upper tracing shows a marked increase in tonus. At first the individual contractions remained distinct but with the increasing tonus the movements became less well defined. The tracing made by the sac shows a prompt increase in tonus. The normal movements were feeble and slow. Though their rate appears to have increased under pituitary extract their strength is not materially changed.

The effect of pituitary on the nonpregnant tube or uterus is surprising. Small doses usually have no effect; large doses, such as produce marked stimulation of the pregnant uterus, may cause a very definite depression or they may not influence the movements at all. In one experiment (Cf. Fig. 13) the longitudinal coat of a tube removed with a uterus with fibroids was beating rhythmically in 100 c.c. of Ringer's solution. Pituitary extract was added in doses of 0.1 c.c. until 1 c.c. had been added. Another cubic centimeter was then introduced into the cylinder, but there was not at any time the slightest sign of stimulation or of depression.

In other instances a large dose was given at once—that is, 0.5 c.c. or 1 c.c. of the extract was introduced. Applied in this way pituitary usually produced a very definite depression. This effect is well illustrated in Fig. 14. At *C* sufficient pituitary was added to the Ringer's fluid to make a 1 per cent. solution. Almost at once the rate became much slower and the strength was decreased. The relaxation was much more marked and the tonus was lowered.

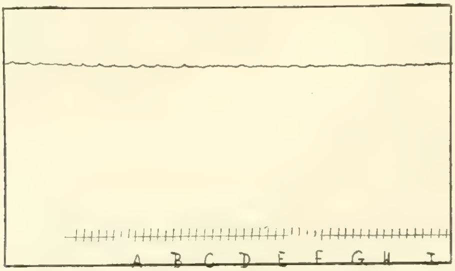

Fig. 13.—Human tube, non-pregnant, longitudinal fibers. Two and a half hours after operation. Segment 2 cm. long. Load 20 gm. Magnification 8. Temperature 39.5° C. *A–G*, pituitary 0.1 c.c. *H*, same 0.3 c.c. *I*, same 1.0 c.c.

It has been suggested that beta-imidoazolyethylamine is the active constituent of pituitary extract. That such is not the case is evident from an examination of Fig. 9. The tracing was made by a nonpregnant tube. At *A* pituitary was added to make 1 : 100. There was an immediate loss of tonus with a gradual cessation of the spontaneous contractions. At *B* the preparation was washed with fresh Ringer's solution and the movements reappeared. Beta-imidoazolyethylamine, 1:100,000 (at *C*), caused a transitory tetanus with marked increase in tonus. The latter effect persisted after a single washing (*D*). At *F* pituitary was again applied and again produced a loss of tonus and a decrease in the rate of contraction.

It will be noted that in these experiments the non-pregnant and the parturient uterus react differently to pituitary. The nonpregnant uterus is unaffected or is depressed; the parturient uterus is stimulated. To what is this change due? The simplest explanation would be that, like the cat's uterus, the human organ changes its innervation, or rather, during pregnancy its motor innervation becomes predominant. Such, however, is not the case, for epinephrine produces stimulation of the human uterus whether it is pregnant or not. Nor does the parturient organ appear more sensitive to epinephrine. The only explanation which offers itself is that some substance sensitizes the uterus to pituitary. What this substance is, whether it is maternal or fetal in origin, I do not know. The sensitizer is certainly not epinephrine. In two experiments the effect

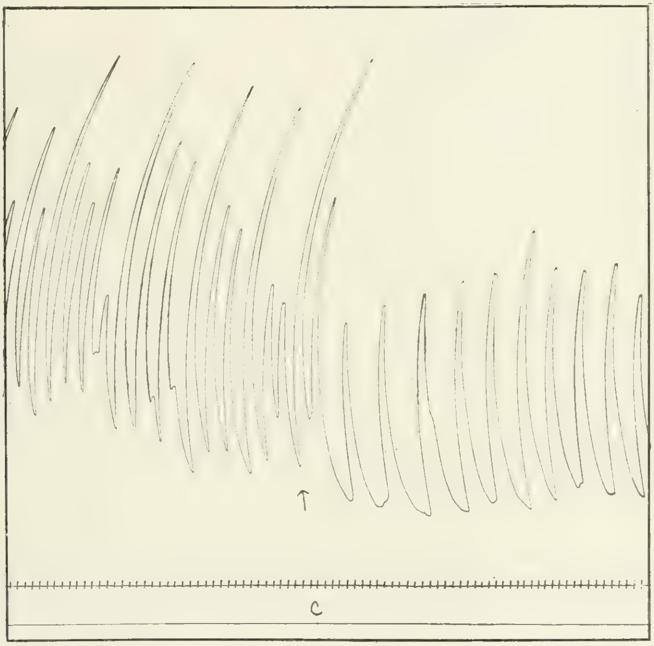

FIG. 14.—Human uterus, non-pregnant, longitudinal fibers from external coat. Three hours after operation. Strip 3 × 0.5 × 0.5. cm. Load 1 gm. Magnification 13.3. Temperature 39° C. At *C*, pituitary to make 1:100.

of pituitary was compared before and after treating the nonpregnant uterus with epinephrine. In one case the depression produced by pituitary was as marked after as before the epinephrine; in the other, pituitary was without effect before and after the epinephrine application.

Here the matter must rest till further investigation offers a satisfactory explanation of the difference in the effect of pituitary on the parturient and the nonpregnant uterus. The difference in the response of the two types of uteri throws some light on the discordant results which are said to follow its therapeutic use.

Quigley(22) has made a very careful review of the clinical literature. From these reports and his own cases he concludes that pituitary extract is an efficient ecbolic only after labor has begun. Humpstone(23) declares that pituitary will not induce labor, and Hirsch(24) has reported that it is of no value as an abortifacient. Patek(25) claims that pituitary allays threatened abortion while Fischer(26) urges that it be employed to complete a miscarriage. Grünbaum(27) finds that the drug has no effect in hastening abortion. These apparently divergent effects may be harmonized by assuming that the uterus must be sensitized before it will respond to the systemic administration of pituitary. During labor the uterus is so sensitized, and hence its almost invariable stimulation. In earlier stages of pregnancy the uterus may be sensitized or not. If it is, pituitary will complete an abortion or miscarriage. If it is not sensitized, the administration of the extract is not followed by stimulation of the uterus. During threatened abortion a nonsensitized uterus may remain unaffected or it may be depressed. If it is depressed by pituitary the abortion is allayed. If the uterus is not affected the course of the miscarriage is not shortened.

How early may the uterus become sensitized to pituitary? The experiment on the tubal pregnancy indicates that within six weeks after conception pituitary may have a stimulating effect. This also indicates quite clearly that unless we regard tubal rupture as the result of true labor contractions, we cannot assign to the posterior lobe of the hypophysis the rôle of hormone for the induction of normal labor. It is true that during pregnancy the pituitary gland hypertrophies and that after the expulsion of the fetus retrograde changes occur. This hypertrophy is limited to the true glandular lobes, the anterior and middle divisions. The posterior lobe shows no sign of increased activity. But it is from the posterior lobe and from this alone that the ecbolic principle can be obtained. Furthermore Kohn(28) denies the existence of an active substance in the posterior lobe during life. He believes that extracts of the gland owe their activity to some decomposition product which is formed during the manufacture of the extract. These facts seem to indicate that the posterior lobe is not concerned with normal labor. Though extracts of the posterior lobe are pharmacologically very active, the lobe itself is not essential to life. Complete removal of this portion of the gland does not interfere in any way with normal bodily activity. It is the anterior lobe which is essential to life. Oddly enough, extracts of this lobe have not been shown to have a demonstrable pharmacological activity. But it is this lobe which hypertrophies during pregnancy. It is apparent that if the pituitary gland is to be regarded as intimately concerned with the onset of labor, the hormone should be sought not in the posterior lobe, but in the anterior portion of the gland.

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50 CENTRAL PARK WEST.

THE MORPHOLOGY AND HISTOGENESIS OF STROMATOGENOUS UTERINE NEOPLASMS.*

BY
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New York.

(With eight illustrations.)

The breadth that the title of this paper assumes is not intended to inaugurate a complete discussion of stromatogenous tumors but rather to indicate one particular question to be discussed, without committing oneself at the onset to a nomenclature which has been both confusing and a matter of dispute.

This question, broadly stated, refers to the relationship, if any, existing between sarcomata and leiomyomblastomata, commonly called "fibroids."

There have been, and apparently are to-day, different views on this subject, differences which in part arise from a different conception of the same term by different authors, also in part from a change in the meaning of a single term due to new facts elicited by the studies of years, and finally in no small degree to a certain lack of clearness which some have had of their own conceptions.

In order to reach a clear understanding it will be necessary to quote the exact terminology employed by the more authoritative writers on this subject and to comment on them in the light of present knowledge. This has been done by many writers before the present attempt; but unfortunately the question still remains unsettled, and we hope that something will emerge as a result. This hope is based on the fact that in all previous studies an imperfect or at least not modern series of concepts was arranged at the outset, if any at all, so that conclusions remain vague. So in this study, after stating the current views on the tumors, we will endeavor to state the principles held to-day on which the views may be built.

The controversy appears to start from articles by Pick in 1894. He reports a sarcoma starting in a myoma and says the process consists in a myxosarcomatous transformation of a pure interstitial myoma, by metaplasia from smooth muscle cells.

Pick now refers to the original interpretation of the process, namely Virchow's, who viewed it as a proliferation occurring in the connect-

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*Read at a meeting of the New York Obstetrical Society, November 10, 1914. From the Laboratory of the Woman's Hospital of the State of New York.

ive tissue of a myoma. This opinion of Pick has been disputed or supported in the past twenty years by a host of writers of whom we shall quote but one as giving the opposing view in its most recent exposition.

Meyer denies the metaplasia of smooth adult muscle into sarcoma, and derives the sarcomata of this type from immature cells which might have developed either into muscle cells or into supporting connective tissue. Sometimes there is more time for the ripening of muscle cells so that a myoma is formed and only subsequently a sarcoma develops out of the rest of the unripe cells. Another time the unripe cells grow as unripe in rapid proliferation into a sarcoma and later single parts of the tumor find time to ripen into muscle elements.

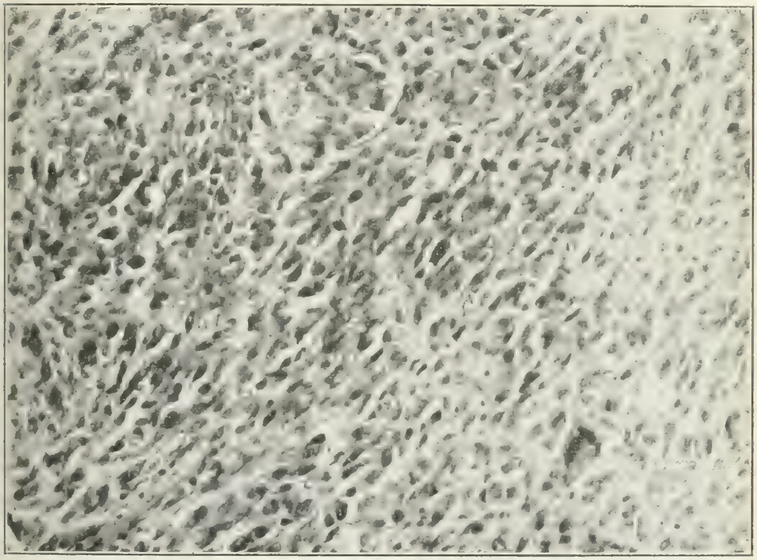

FIG. 1.—Sarcoma uteri. Completely undifferentiated cells. Origin cannot be determined. No. 10324.

Roughly, we may enumerate a number of tumors characteristic of the uterus. The sarcoma of the cervix of early life need hardly enter into the discussion. The pure myoma will be examined as to its histogenesis, its possibilities of clinical malignancy and its variants from type. The pure sarcoma will be considered in histogenesis and definition. But it is in reference to the so-called myosarcomas, or malignant myomas, myomata sarcomatosa, that the chief inquiry will be directed. This is a sometimes macroscopically visible but often an unsuspected area usually central in the myoma.

This may be softer than normal and faintly yellow or pink, the cells are numerous, large, with many mitoses and all the histological features that are attributed to sarcomata. This area merges insensibly into the typical myoma, with what are described as direct transitions from the sarcoma cells into adult smooth muscle cells. The frequency and seriousness of this condition will be discussed later.

Pathological terminology and pathological conceptions have changed since the time that Pick wrote, twenty-five years ago, so that his view must be questioned from several aspects. Virchow's explanation, with its modern exponents as Meyer, also will require fresh examination.

The first inaccurate idea which presents itself in this general problem concerns the method of growth of tumors, and a few quotations will be given to make this evident.

Mallory says: "It is a fundamental principle in the biology of tumors that they grow entirely by multiplication of their own cells, not by the transformation of other cells. Statements of transitions from one form to another do not take this into account. This is especially true of rapidly growing infiltrative spindle-cell tumors of the uterus which are probably rapidly growing leiomyomata."

Borrmann states it can be accepted as a fact that once the sarcoma started in one spot in the myoma it increased from itself and not through conversion of muscle cells at its growing edge. The correctness of the conception is not in the least to be doubted. Glazer says rightly that one cannot conclude from the presence of muscle elements inside sarcoma tissue and from the intimate admixture of the two that the one cell (sarcoma) was derived from the other. There can be an infiltration of the muscle cells by the sarcoma cells. That can never be excluded, while the transition of one into another can never be incontestably proved, least of all through high magnification. In Borrmann's opinion the possibility of confusing the two through morphological similarity rises in proportion to the magnification.

Ribbert says: "At times one really thinks there is a transition but this is a deception, due to young musculature lying in a thin layer of a normal musculature. Growth of sarcoma is by infiltration so that the cells of the tumor itself lead to the new formation, never that the bordering cells not belonging to the sarcoma are converted into tumor elements." Meyer makes the same statement. That the muscle cells in the neighborhood of a sarcoma may proliferate, then degenerate, and that such cell forms may resemble sarcoma cells is a matter of course. The whole picture of these apparent transitions proves nothing except degeneration of muscle cells in a mixture of likewise degenerating sarcoma cells. These quotations merely prove that it is not correct to say that a myoma cell changes into a sarcoma cell, and that Pick's view must be modified. There are two ways in which this modification can be made, either that this is some form of change, degenerative or otherwise expressed, in the myoma, or else that there are two distinct tumors, a myoma and a sarcoma admixed. The first view would differ from Pick's in that it postulated a single tumor, a clinically malignant myoma rather than two tumors, a sarcoma "degenerating" from a myoma, which modern histogenesis repudiates. It necessitates, however, a change in the conception of myomata, which Winter states do not undergo malignant change. The second view is that of Meyer and more recently Ogorek. It might be held that Pick's explanation after all was correct if one understood his use of the word sarcomatous. But he distinctly states that the myoma turns into a true sarcoma, which cannot be accepted under the current definition of a sarcoma. In order to clear the question up, there are a number of pathological processes which must be discussed as well as the matter of definition, classification and terminology of stromatogenous tumors.

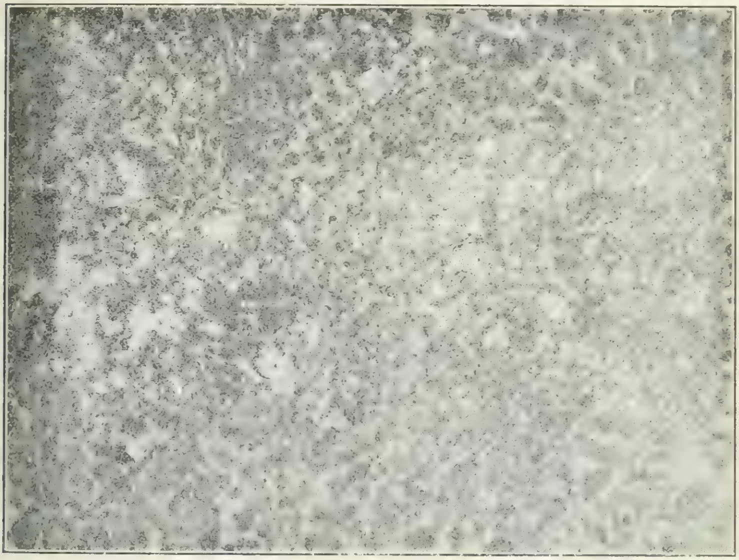

FIG. 2.—Sarcoma uteri, giant celled. No. 7627.

First we find that this confusion has centered around changes which some affirm occur in the cells of tumors, and which others deny. These changes have been described as metaplasia and degeneration. By metaplasia is meant that during the process of multiplication of cells the newly formed cells take on a type different from that of the parent cell. Thus the parent cell may be spindle shaped and the daughter stellate. Metaplasia is most satisfactorily and completely described by Schridde in his monograph *Die Ortsfremde Epithelwucherung des Menschen.* A direct transformation of a developed cell into a cell of another type is denied. Schridde shows that the laws of ontogeny govern the development of the different types of epithelium, and this may be taken as true for mesenchymal cells as well. From one primitive cell arise all other types. The type characteristic is dominant for the locality in which the cell develops; but the other characteristics are latent. If in the course of development the character correlation is disturbed the latent becomes dominant and a cell of a type foreign to the locality is produced. This is plainly not the process which takes place in the tumors under discussion. Here, if we are to grant that the cells have undergone change and not that they were two different cells from the start, the process must not be metaplasia, but rather anaplasia. Anaplasia signifies that the newly formed cell loses the type of the parent cells, spindle, stellate or other, and remain simple and

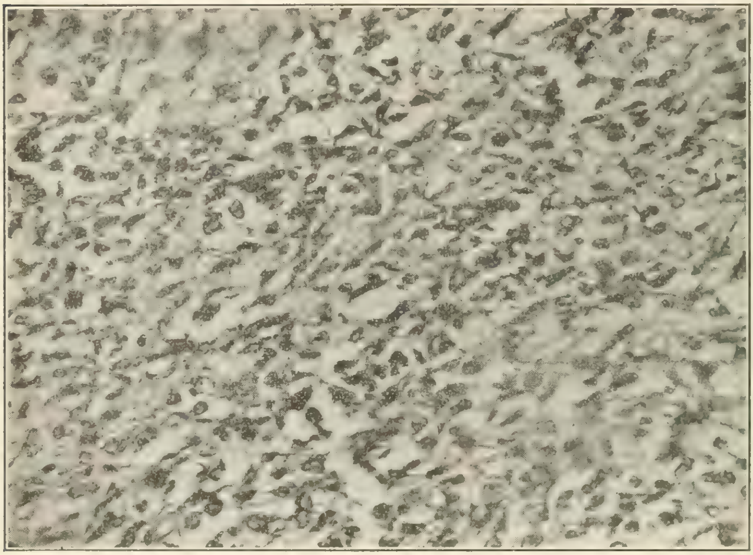

FIG. 3.—Sarcoma uteri. Stellate cells originating from the stroma. Same form may arise from the stroma cells of either the myometrium or the endometrium. No. 7627.

without characteristics, in other words globular. This is regression, reversion, 'rückschlag' or 'rückbildung'.

Ribbert says: "In every growth process and especially in inflammation there is a noticeable increase in the size of the cells, and this is the first step in regression. This also occurs in tumors, especially sarcomata. The assumption that adult connective tissue may form tumors, implies nevertheless that its cells first reverted to embryonic type. As long as there is still fibrillary intercellular substance the tumor can be identified, but beyond this point its histogenesis and even its nature are indistinguishable".

Ribbert states that in regeneration smooth muscle cells become shorter and more spindle shaped, resembling more connective tissue cells, and in that the nucleus changes from a rod to an oval. Anaplasia, as far as it has a rôle in tumor formation, is not sufficient to wholly alter the character of the original tissue, it can at most make it difficult of recognition. But it can never lead to the loss of all specific characteristics of the cell, never to an 'Entdifferenzierung.' If we were to find tumors composed of cells which cannot be classified either by their order or their finer structures we can explain them neither by metaplasia nor regression, from fully developed cells. There remains nothing else than to derive them from cells of an earlier developmental stage. This might be denied, for if pathological processes may cause an intense loss of differentiation tumors might do the same. Ribbert however thinks the explanation of the origin of tumors from embryonal germs is a much more natural assumption than a complete aplasia. Probably tumors of the connective tissue, if they really occur without embryonal segregations, do not come from differentiated bone, cartilage, connective tissue cells, etc., but from their forerunners, as periosteum, or from elements which proliferate in regenerative processes and in inflammation. Some authors go much further than this and assume a loss of differentiation far beyond this; especially von Hansemann, who says the cells which form the tumor go back through an extensive 'Entdifferenzierung' not only to an earlier developmental stage in which the functional formation is lacking, but even to a point such as is not present in the normal body. Von Hansemann ascribes the characteristic growth ability of tumor cells to their anaplasia, not to any new particularity.

Meyer objects to the term anaplasia for these cell changes, since it prejudices the type, or the origin, of the variation in cell structure.

Meyer would say that it is not proved that this is an anaplastic process but that it is possible that both the ripe and the unripe cells sprang from an ancestral unripe cell. Meyer admits that he regards most of the cases of variation in cell structure as regressive or degenerative but he does not wish to apply the term anaplasia to visible structural alterations.

The boundaries between anaplasia in von Hansemann's sense and cell degeneration in Meyer's appear indefinite and both go hand in hand. Anaplasia and malignancy are not inseparable. It is not because of anaplasia that a cell is malignant as von Hansemann seems too imply. In many pathological processes the cells are anaplastic to the degree of looking neoplastic but they show no malignancy. What the essential nature of malignancy is, of course, we do not know.

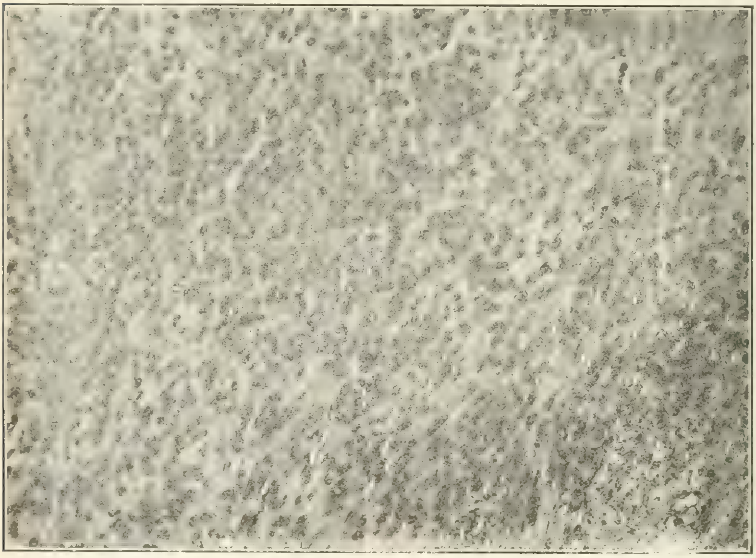

FIG. 4.—Aplastomyoma uteri, myosarcoma, or, more commonly, myoma sarcomatosum. The term aplastomyoma is preferable since it suggests the mild grade of malignancy. Myosarcoma should be limited to the rare mixed tumors, true myomas and sarcomas combined. No. 8532.

Meyer's view is that there is some character that makes the cell malignant apart from any degenerative or regressive process, and that the visible changes in cells are merely forms of degeneration. Meyer's objection to the term anaplasia appears to be more theoretical than real, while the process of simplification of cell form is very real and a frequent occurrence. For this reason it seems proper to continue the use of the term anaplasia. Although anaplasia does not necessarily imply malignancy it is very closely associated with malignancy and is indeed its optical evidence. While we cannot determine the real nature of malignancy we must depend on its optical evidence, anaplasia, to guide us in microscopical diagnosis. There can at all events be no objection to the term aplasia which commits us neither to a theory of regression nor of embryonal origin. Instances of anaplasia occurring in the stroma surrounding carcinoma have often been given. Another probable instance is the phenomenon of the Apolant-Ehrlich transplants, where a mouse carcinoma was converted into a sarcoma upon transplantation into another mouse. It is not to be assumed that the carcinoma cell was converted into a sarcoma cell, but rather that the irritation of the carcinoma transplant produced proliferation, anaplasia and malignancy in the stroma. This is of especial interest because it shows the development of malignancy subsequent to anaplasia.

It is not to be assumed that the stroma cells had the quality of malignancy hidden in them, as Meyer postulates. Krukenberg's tumors show the same phenomenon in man, that is of anaplasia of a stroma surrounding a carcinoma with subsequent development of malignancy.

The next question presenting itself is raised by Pick's use of the word sarcoma. It is plain that he means a tumor of a fundamentally different nature from a myoma, because he says they are not merely sarcoma-like but that they are definite sarcomata. Pick and all subsequent writers who take his view base their conclusions in classifying and naming these tumors strictly upon morphology, as is clear from their consideration of transitions. Whether morphology is a satisfactory basis for classification must therefore now be considered. A morphological classification is one based upon the form of cells without reference to their origin, while a histogenetic classification refers the tumors to the structures from which the cells actually sprang. The best exponent of the morphological system is von Hansemann, who believes that as the knowledge of histogenesis is not complete and never can be complete, morphology is the only criterion practicable.

His thesis is best illustrated by a consideration of epithelium. Epithelium he states is denoted by its situation, covering a surface. A carcinoma of the stomach may in no way conform to the conception of epithelium. Its cells may be globular, cover no surface, not be in continuity, and may be in the tissue spaces. Again connective-tissue tumors may become so epithelium-like in their arrangement that they cannot be distinguished from ecto- or entoderm. From these possible changes in form, von Hansemann concludes that there is only one possible definition of epithelium, that of situation, pure morphology. In his opinion the ground name of a tumor should be morphologic, and when anything is known about the histogenesis an adjective should be added.

Ribbert takes issue with Hansemann in these regards stating that while it is simpler, it is still disadvantageous to put a dubious tumor into an apparently false class. He thinks it is better to confess ignorance, where the histogenesis is in doubt, but to classify according to the kind of tissue forming the tumor. This seems to be the safest and indeed the practically universally adopted method. This matter of morphologic or histogenetic classification is the very basis of the proper understanding of the tumors we are discussing, and it is the difference of opinion as to the histogenesis which explains the different terms used to designate them. Were we to adopt von Hansemann's pure morphological basis we would call them myomata. But there would still be a possibility that the completely undifferentiated cells were sarcomatous, and that they were mixed tumors.

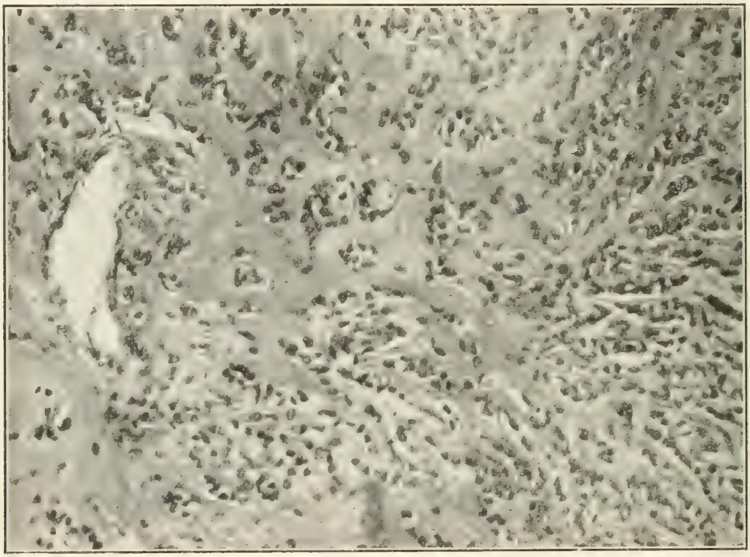

FIG. 5.—Aplastofibroma uteri; sarcoma uteri. This tumor has the gross appearance of a myoblastoma; microscopically it shows only traces of muscle cells and has large amounts of collagen fibrils as seen in the illustration. This proves its connective tissue origin. To call this tumor a sarcoma gives a false idea of its very slight malignancy. No. 9396.

This brings us to the consideration of the definition and nature of sarcoma. The diagnosis of these tumors under discussion appears to be usually made from a histological picture.

This is not true for all of them, for a number of them have developed metastases and been fatal. However as has been said, many of them are entirely unsuspected clinically and the diagnosis is practically always a laboratory finding, based on the richness of cells, the mitoses and the invasive border zone. That these are not invariably reliable data, and that there is no absolute histological criterion for the diagnosis of sarcoma will appear from the following quotations.

Ribbert, "That microscopic criteria are insufficient to make an absolute distinction between sarcoma and the other conditions is proved even in the instance of some granulomata. Hence the fact that these myomata present large cells with large nuclei, mitoses and optical unrest, and all the marks of sarcomata does not compel us to make that diagnosis. Its independence (biologic) is the sole criterion."

Borst, further in his *Einteilung der Sarkom* says, "A sarcoma in its first development could not be distinguished from a simple inflammatory new growth of the connective tissue. However much one may try to secure differential diagnostic points for the separation of sarcoma and granulation tissue one gets no nearer the goal. Truly in a fully developed sarcoma, from the arrangement of the blood and lymph vessels, the cells and intercellular substance one can usually differentiate from granulation tissue. But the sarcoma in its first stages can by no means be distinguished from inflammatory or regenerative connective tissue formation. Who can say that that is the beginning sarcomatous metamorphosis and not a simple reactive inflammatory hyperplasia or regenerative process. Who does not know the highly manifold non-blastomatous but simple reactive growth process of connective tissue and epithelium which accompany carcinoma. And how much more difficult to distinguish what is blastomatous and what reactive in sarcoma where the tissues grow from the same mother tissue and exactly in the zone of youngest growth are intimately mixed. So we have added to the fact that a morphological classification of sarcomata was unsatisfactory the second fact that a morphological recognition is not always possible.

Borst further says that the term sarcoma itself has recently been regarded as antiquated and useless. It has deep roots, however, and the term has remained, though its interpretation has altered. A sarcoma to-day means a tumor arising from the connective-tissue group, and which is composed very largely of cells, while intercellular substance is in the background, both quantitatively and qualitatively incompletely developed. The great majority of such tumors are characterized by malignancy, local destructiveness and ability to metastasize. In these respects lies the difference between sarcoma and the so-called benign connective-tissue tumors.

There is no doubt that histogenesis should be considered for a scientific classification. But this presents the greatest difficulties.

The very first development of a sarcoma no one has ever seen. We are less able to judge of the histogenesis of a sarcoma than of any other tumor and this must be remembered in the classification. Indirect evidence must be invoked, but this is not always reliable. At all events it is plain that the term sarcoma is used in a much more restricted sense than when these tumors were described by Pick.

Borst used it for the above described cellular connective-tissue tumors broadly, including those derived from neuroglia and myoglia in order to obtain a practical classification. Ribbert is inclined to limit the term to the pure supporting tissues and to call the muscle and glia tumors malignant myomata and gliomata.

The one fundamental feature which characterizes a sarcoma and separates it from a blastoma is that it is not anaplastic, but aplastic from its inception, that it springs from an embryonal cell. This origin can be no more than surmised, but an adherence to this conception will prevent the use of the term sarcoma for adult cell tumors showing anaplasia or metaplasia, such as the ones under consideration.

Borst in his classification of sarcomata recognizes various stages of ripeness of cells. A tumor arising from a fully matured cell, Borst designates as a blastoma, thus myoblastoma in place of myoma. Of the unripe stages of tumors Borst makes two divisions, the completely undifferentiated, which he calls sarcoma and the partially ripe which he calls blastosarcoma, leiomyoblastosarcoma, etc. That there is a practical gain by the use of the term blastoma seems clear, for it denotes the benign type without adding any confusing elements. The entirely unripe cell tumors should be called sarcomata. These are without intercellular substance or with a minimal amount and their histogenesis may be only inferred. For Borst's designation of the partially ripe tumors, the blastosarcomata with the prefix of the type, thus fibroblastosarcoma, there is an objection of cumbersomeness. But more than this there is an objection to the use of the term sarcoma for these tumors in any event. For there is already a firm conception for the term sarcoma, which is that of outspoken malignancy. It is not desirable for the pathologist to explain in his report that some sarcomata are only mildly or locally malignant, it would be better to have an independent term descriptive of this midway group. This group of tumors merges insensibly from benignancy into malignancy. There can never be any absolute criterion for their malignancy and their interpretation will always be affected by the personal equation of the individual observer. Hence it is better to have a separated designation for them than to use a term already denoting malignancy.

Ribbert's designation, malignum, is a clinical term which is being universally abandoned. A very simple designation which would impress the nature of this group and separate it from the ripe benign and the embryonic malignant forms would be the term aplastoma joined to the type cell of the particular tumor under discussion, thus aplastomyoma, aplastofibroma, etc., in place of myoblastosarcoma or Ribbert's malignant myoma. This is the widest term which embraces all semiripe tumors. There might also be a subdivision of this group into anaplastomata, namely, those showing transitions from the fully ripe into the immature cell and where the process was supposed to be anaplastic.

This is the conception which Meyer combats, saying that transitions by no means prove anaplasia and that anaplasia should not be applied to visible cell changes.

Still, as Ribbert says, anaplasia is very characteristic of all-growth processes, especially tumors, and moreover it appears that it is precisely anaplasia which is accountable for the changes in the tumors under discussion, and so the term anaplastomyomata seems to be fitting. The term aplastomyoma would apply to Meyer's conception of malignant myoma. This terminology gets rid of the confusing terms fibrosarcoma, myosarcoma, etc., which should be limited to the very rare true mixed tumors. The fact is that these terms are not so limited at present but are commonly and incorrectly used. The completely simple cell tumors are rare. The chances with these are certainly that they are embryonal, since it is not to be expected that anaplasia would proceed to that extent. Hence they are to be called sarcoma.

All mesenchymal tumors should be grouped under type cell if possible and the term sarcoma reserved for undifferentiated cells.

As Mallory says: "Under every recognized variety of tumor should be grouped the slowly growing and the rapidly growing tumors built up by the multiplication of the same type cell. In no other way is it possible to fully understand each variety of tumor and find out its characteristics. The type cell is the one important element in every tumor. From it the tumor should be named, not from some peculiarity of minor importance, such as method of growth or arrangement of cells or form of retrograde change.

It remains to examine the histogenesis of myomata themselves to see what may be learned from them as to the origin of our group." This will be taken from Ribbert's description. He states that the independence of the myoma occurs very early, even before the myoma is macroscopically visible. It might be assumed that minute muscle elements were set aside at the very first *anlage* of the uterus, the fact of their microscopical size would account for the nonexistence of myomata in childhood; but it is not necessary to assume an embryonal genesis, since the uterus is an organ having manifold processes of growth with conversion of its musculature, so it is possible that in late development disturbances may occur which lead to an isolation of muscle elements. We seldom see the beginnings of myomata, but occasionally may see the microscopical *anlage* of these. They are recognizable by their darker staining. These are formed solely from muscle cells, the smallest have no blood-vessels. The cells are much more closely packed than in the neighboring musculature; they are smaller; poorer in protoplasm and they have short oval nuclei. So it is still growing youthful, undeveloped musculature. These have sharp borders and at times occur in lacunæ between the normal myometrial cells. Only here and there and then only when of long oval form do they unite with the rest of the musculature. Even here there are no transitions in such manner that the young cells become older, but in such way that one can distinctly see the boundary. So myomata owe their existence to an abnormal development process which tends to the isolation of muscle buds. This description of Ribbert's of the histogenesis of myomata is modified by Meyer who holds that the isolation of the myoma is

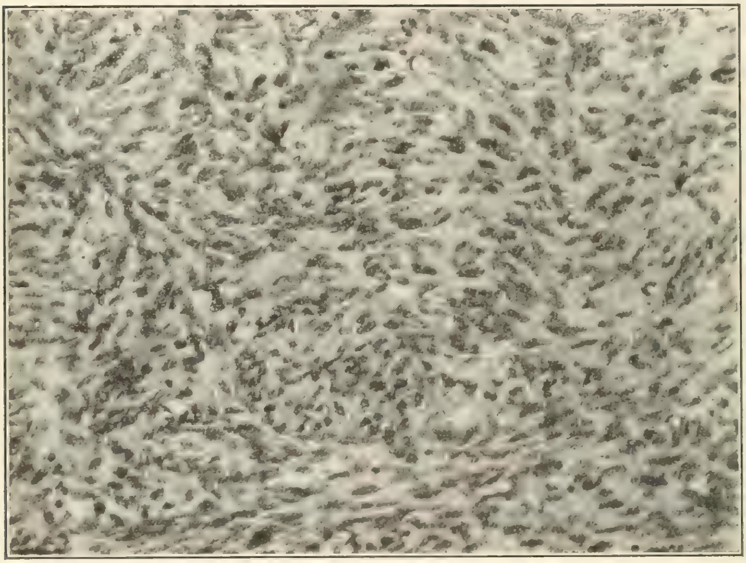

FIG. 6.—Anaplastomyoma uteri (aplastomyoma anaplasticum). So called sarcomatous degeneration of a myoma. An extremely cellular rapidly growing myoma showing transitions into mature, slow growing regions. No morphological difference between this type and the aplastomyoma, but this type shows the transitions into true blastomyoma. No. 8422.

not as early or as complete as described, but that any muscle cell capable of proliferation may give rise to a myoma. Probably Meyer's view is more correct, but in either case it is plain how simple would be the regression of these young cells into malignant form.

There is no inherent reason from the histogenesis of myoma why they should not assume a malignant type. On the contrary, the only known element which seems to separate malignancy from benignancy is rate of growth, which is dependent merely on the grade of differentiation of the cells.

To summarize the preceding facts which are the data upon which a discussion of these tumors rests, we find first that changes in tumor cells do occur and that these are anaplastic or regressive. Second, that it is very doubtful if regression can ever go to a point where the histogenesis of a cell becomes lost. Third, the term sarcoma should be limited to a tumor embryonic in origin, and aplastic from its start. Fourth, the old idea, that one form of tumor (myoma) may merge insensibly into an entirely different tumor (sarcoma) is based on a misconception. Five, the histogenesis of myomata shows them to start from young unripe muscle cells and to be of varying grades of rapidity of growth. Six, this origin makes it natural that they should undergo regression to a point of clinical malignancy. Seven, histogenesis should be the basis of classification of tumors, morphology alone leads to misconceptions.

How then shall we classify these tumors? There are but two possibilities, either that they are regressive myomata, aplastomyomata, myoma malignum or else they are mixed tumors. The assumption of mixed tumors needs further explanation. Virchow originally said that the sarcoma started from the connective tissue of the myoma; but in the early myoma there is no connective tissue, and yet the sarcoma must have an embryonal origin, for that is the very element that constitutes a sarcoma. So we must imagine if these are mixed tumors that there was one cell even earlier in type than either muscle or connective tissue which had the possibilities of development into either form, muscle or connective tissue. This cell did develop then in both directions and produced a mixed tumor, a myoma and a sarcoma. This assumption, which is that an undeveloped cell should produce an adult and also an embryonic offspring has no supporting data. The mixed tumor as we know it arises from a cell having two possibilities of development, but both of a higher type than the cell itself. Thus an osteochondroma may arise from periosteum of simpler type.

The only other explanation for such a mixed tumor as this would be that there were two cells from the start, a muscle cell and an embryonal cell and that the muscle cell developed into a myoma having the embryonal cell enclosed within it and that at some time later this also sprang into activity. This is a pure assumption not susceptible of proof.

Meyer and others assume these to be mixed tumors, reasoning that they are sarcomata and knowing that sarcomata are of embryonal origin.

As Ribbert says, for another type of neoplasm, where histogenesis fails one must use indirect evidence, though with this reservation, that this is liable to lead to error. There are certain bits of indirect evidence which may be given in reference to these tumors. The central location of a large majority of these so-called sarcomata in the myomata is very suggestive of a growth, or nutritional relationship rather than a mixed tumor. It is true that the sarcoma is not always central but it is certainly never as diffuse as is the association in mixed tumors. While centers of neoplasms are subject to disintegration from poor blood supply, still germinal centers are regions of most rapid growth and it is characteristic of such to have the youngest cell in the center. The youngest undoubted sarcomata that we know of are always sharply circumscribed, as is natural, since they are too young to have caused the apparent transitional changes which have been described in these tumors.

A clinical fact of greatest significance is that these findings are as has been noted, almost invariably laboratory findings; that the patients were not suspected of having sarcoma, and when these tumors were removed there were no recurrences. It is not to be expected that sarcomata which are of embryonal origin should be so benign. Probably a greater proportion of myomata go unoperated than are removed by operation, hence deaths should be much commoner than they actually are, if these tumors were sarcomata and were as frequent as has been reported. If it were possible to prove that these tumors sprang from the cells of a myoma and that there were direct transitions between the two, then one would have proved them to be leiomyomata and not sarcomata. This is not susceptible to actual proof as has been pointed out. Another bit of indirect evidence is that myomata normally and invariably have different areas showing different rates of growth and that the richness of cells varies from one field to another. This makes the matter of difference in age and development of cells a normal finding and it is merely a question of degree when the picture shall be called malignant. Indeed it is generally recognized that a number of cases reported as sarcomata have been merely cell rich myomata. Raab has emphasized this as a cause of mistaken diagnosis. Compared with the probabilities of the occurrence of two distinct tumors we may fairly say that the chances very greatly favor rich cellular myomata and are very much against mixed tumors.

Ogorek is the most recent writer to report a tumor of mixed origin. He describes two types of cells, a polygonal from the connective tissue and the muscle cell. Both of these are stated to have malignant characteristics. There were transitions between the muscle cell and the normal musculature of the uterus but no transitions of the polygonal cell into any other form. The connective tissue cell is stated to be the primary malignant element. The illustrations accompanying this article are insufficient to demonstrate the descriptions in the text, so that the reader must rely upon the descriptions. Granting these, the tumor must have been of some other type than the commonly reported myosarcoma with which we are concerned. For in these latter the transitions between the muscle cell and the sarcoma cell are the very elements which have confused the diagnosis. It is to be regretted that Ogorek has not more incontestably established the existence of a myoma in his case. His statements that a capsule was not present and that the transition between myoma and myometrium was only denoted by the differing cell and muscle bundle arrangement is anomalous in such an extraordinarily large tumor as his. The descriptions might easily apply to the change at the margin of a sarcoma invading a myometrium

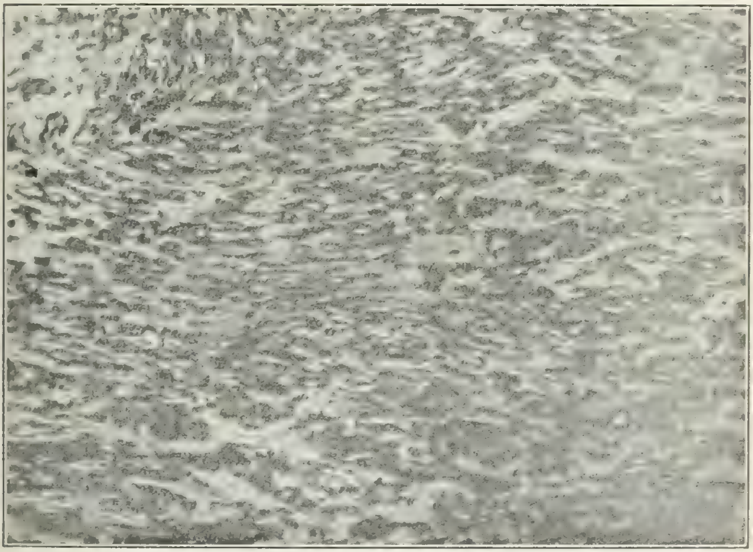

FIG. 7.—Myoblastoma uteri. Very cellular myoma, such as has been wrongly called myosarcoma. No. 9784.

without a myoma. If that were the case there would be no difficulty in understanding the primary connective tissue origin which he asserts for his tumor. But in the presence of a myoma this primary connective tissue origin leaves no other explanation than that of a mixed tumor. The tumors which Meyer describes as mixed have the transitions which Ogorek's does not.

If Ogorek's description will permit the modification I have ventured, namely, the absence of a myoma, the case becomes one of the not infrequent pure sarcomata which have nothing to do with myosarcoma so-called. But if the myoma is incontestable there must be either the real or apparent transitions between the muscle cell and the malignant cell or else the case is anomalous. Certainly a much more definite proof of the actual presence of myomata must be made in the future than has appeared in the many reported cases of myosarcoma. The diagnosis of a mixed tumor or a myosarcoma stands or falls with the presence of an actual myoma. If a definite myoma can be demonstrated as well as a definite sarcoma then there is a real mixed tumor. If however only muscle cells appear within a sarcoma the appearance only denotes a sarcoma originating from the supporting tissue and invading the myometrium.

The reasons for regarding these tumors as anaplastomyomata (myoma malignum) rather than mixed myosarcoma may be summarized then in this way.

1. The histogenesis of myomata show them to be derived from unripe cells, which are anaplastic.

2. Anaplasia is a normal finding in tumor formation dependent upon rapidity of growth. It is frequently associated with malignancy.

3. The location of the malignant areas centrally suggests nutritional or growth anaplasia.

4. Indirect evidence, relative clinical mildness, is against true sarcomata.

5. Mixed tumors are rare while varying cellular richness in myomata is always present.

6. The mixed tumor origin though possible, has no corroborative data.

For these reasons we classify these tumors as anaplastomyomata (myomata malignum according to Ribbert). We discard the term sarcoma in referring to them.

The tumors which do commonly appear in the myometrium are aplastomyomata (myoma malignum) and sarcoma simplex. An invasion of a myoma by a sarcoma deserves no special designation. Adding to these two the possible mixed tumor, the myosarcoma, completes the list of stromatogenous tumors encountered in the myometrium. There has been some discussion as to whether the pure sarcoma of the endometrial stroma forms a special type of tumor. In any event it does not cause confusion with myomata. The rare teratomata and Wilm's tumor of the cervix cause no confusion with myomata.

The Clinical Significance and Frequency of Malignant Myoma.—Much has been written on this subject and various percentages have been given for their frequency. The commonly accepted figures of Winter are 4.3 per cent. which may be taken as the average, though Wornelos and Bumm give even 10 per cent. Other figures are those of Martin, 3 per cent., Fleichmann 4 per cent., Schottländer 3.8 per cent., Hertel 2.8 per cent. The appreciation of the origin of the condition as a very rapidly growing and cellular myoma gives the clue to these differences in opinion since there is no definite criterion which stands to separate the malignant from the non-malignant case. In my own limited experience of the past three years we have examined 366 myomata many of them multiple while we have designated but four of them malignant. On the other hand we have seen two pure sarcomata and two sarcomatous polyps in the same length of time. The relative rarity of sarcoma

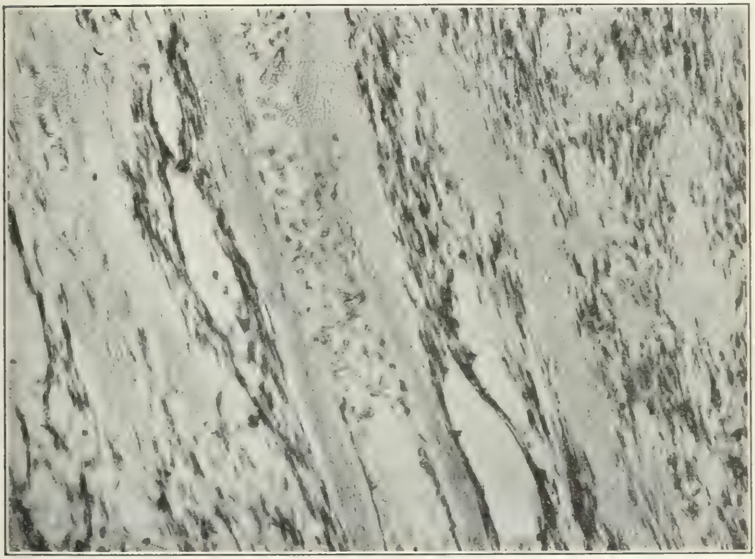

FIG. 8.—Myoblastoma uteri (common fibroid). To show the origin of the frequently occurring hyaline degeneration. 1. Lumen of small blood-vessel cut longitudinally. 2. Endothelium. 3. Broad band of collagen substance deposited outside the endothelium. 4. Outer wall of blood-vessel.

recurrences after total extirpation for myoma speaks certainly against the high percentage given by some.

How shall the surgeon regard these tumors? The considerations of histogenesis and interpretation gone into in detail in this paper are of no practical importance to the surgeon. But if the theme had any excuse for a study it was upon that basis. For the practical interest of the surgeon it must be borne in mind that the diagnosis almost invariably is a laboratory finding giving no clinical sign. This is in accord with the fact that the majority of these tumors are only mildly malignant. Few of them metastasise and complete removal of the myoma suffices to ensure safety from recurrence. The pure sarcoma varies in malignancy according to the ripeness of its cells.

Each case must be judged by itself, but the general conclusion is that the importance of the anaplastomyoma has been over-estimated.

MESENCHYMAL CELL.

Descendants.

Connective tissue, cartilage, bone muscle, etc.

Tumors.

Differentiated,	*Partly differentiated,*	*Undifferentiated,*
Benign,	Semimalignant,	Malignant,
Blastoma,	Blastosarcoma, or	Sarcoma.
	Type-cell aplastoma.	

Varieties.

Fibroblastoma,	Aplastofibroma,
Myoblastoma,	Aplastomyoma,
Chondroblastoma,	Aplastochondroma,
Osteoblastoma,	Aplasto-osteoma
Lymphoblastoma,	Aplastolymphoma,
Glioblastoma, etc.	Aplastoglioma,
	instead of
	Myoblastosarcoma (*Borst*)
	or Myoma Malignum (*Ribbert*)

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Woman's Hospital, New York City.

A NEW METHOD OF PAINLESS CHILDBIRTH.*

BY

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THE desire for a means of abolishing or lessening the pains of childbirth or of doing away with all recollection of them is certainly no new fad. However, anything more than slight success is recent. Eight years ago Krönig and his followers in Freiburg started with injections of scopolamin and morphine to develop what they called "Twilight Sleep"—forgetfulness of labor. Despite the adverse reports and criticisms of other clinics of Germany and elsewhere they devotedly stuck to their task until now the method is becoming more and more generally employed, at least here in America, so that many of us to-day feel confident of its safety and usefulness. The chief remaining objection is that it consumes much too much of the obstetrician's time. But, unless something easier of manipulation is found, we will have to arrange our affairs so that we can give these women the necessary attention. Speak to those who have had "Twilight Sleep" and you will feel that no sacrifice is too great to give other women similar blessings with this safe method.

In France as in the rest of the world experiments have been made to produce painless childbirth, as is evidenced by such work as that of Pinard in 1878 and Doleris in 1900. These attempts have failed and now have only an historical interest.

On July 21, 1914, Prof. Ribemont Dessaignes of the French Academy of Medicine delivered before that body a lengthy address on painless childbirth. In 112 labors he used a drug called "Tocanalgine Obstetrique" recommended to him by the French chemists M. George Paulin and Dr. Pierre Laurent who had tried it in animals and found it perfectly safe.

This substance was obtained by Paulin by the action on chlorhydrate of morphine of living ferments resembling beer leavening. This is a special method of fermenting opium so that its toxicity becomes about 1/15 that of morphine and the entire morphine is transformed in a substance that crystallizes in a regular way.

Prof. Pouchet who further examined the drug said it resembled

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* Read at a meeting of the Section on Obstetrics and Gynecology of the New York Academy of Medicine, Nov. 24, 1914.

the oxydimorphine of Marne. It is a hydration product of morphin, but shows no characteristics of morphine. It makes the organism more susceptible to such drugs as strychnine and digitalis. It accentuates the vasomotor reflexes and the general reflexes are exaggerated. There is an increase of salivary, intestinal and renal secretion. Toxic doses are only reached when two or three centigrams are injected for each kilogram of body weight and are evidenced by bloody and mucous diarrhea. The first toxic cerebral symptoms resemble inebriation.

Prof. Dessaignes discusses the results of his work under five heads,

1. The action of the drug.
2. Length of time before action sets in.
3. Length of analgesia produced.
4. Effect of the drug on the mother in labor, delivery, and puerperium.
5. Effects on the child.

When using it in labor the drug acts on the brain and sympathetic centers without noticeable effect on the spinal cord. It is probably carried there by the blood stream.

The action is very prompt and in two or three minutes there may be prickling or itching sensations. The patient becomes drowsy and after ten to twenty minutes there is no further sensation of pain. In eighty-four cases there was complete analgesia; in twenty-four, marked but not complete; and four patients claimed that they had no relief but their screams became less violent.

The analgesia lasts from thirty minutes to twelve hours. Sixty-three cases needed only one injection. Thirty-nine became painful at the end of five hours. Nine received three injections, one case five injections.

There was no effect on the uterine contractions as tested with the hysterograph of Prof. Fabre of Lyons. There was one case of post-operative hemorrhage. The placenta came away on an average of thirty-two minutes after birth. There was no mental anxiety, no physical exhaustion, no disturbance of temperature or pulse and no after pains until the analgesia had worn off. Involution was normal and nursing not affected. Version, forceps, perineal suture were performed without further anesthetic. One hundred and twelve labors resulted in 115 babies of whom 77 cried out at once, 28 seemed dazed, and were apneic, or as we call it, olisopneic, but after a few minutes breathed with perfect freedom and were comparable to Cesarean babies.

There was one fetal death during labor in a case where the fetus was doing poorly at the time of admission to the hospital. Two babies had convulsions shortly after birth, autopsy showing meningeal hemorrhage. Three premature children died at the end of one, two and eleven days. All others left the hospital in perfect health.

In the discussion of the paper M. Pinard of the Baudelocque said that his results confirmed those of Prof. Dessaignes, at the Beaujean.

The drug is given hypodermically, 1.5 c.c. for the first dose and 0.5 c.c. for succeeding doses.

The report of which I have just given an abstract, is what interested me and encouraged me to try this drug. I had expected to have a larger number of cases to report upon, but the promised shipment from Paris did not arrive, so I will give you with apologies the results in three cases in which "Tocanalgine" was tried for me by the House Gynecologist at the Lebanon Hospital.

Case I.—No. 47558, E. B., colored, not married, para-i. Full term, normal measurements, L. O. A.

Admitted Oct. 29th 1.30 P. M., two fingers dilated. Fetal heart, 138. 3.15 P. M., 1.5 c.c. "Tocanalgine" was given. Pains every five minutes. Fifteen minutes later no pain, contractions fewer. 6.15 P. M., recurrence of pain, 0.75 c.c. "Tocanalgine," five minutes later no more pain, sleeping at intervals. 8.55 P. M., 1 c.c. pituitrin. 9.55 P. M., female child born, weight 8 pounds, 5 ounces, normal measurements.

Placenta expelled forty-five minutes later. No tear, no hemorrhage. Baby apneic for four or five minutes, then did well. Puerperium was normal.

During the administration of the drug the patient had no headache, no nausea, no prickling sensations and no thirst. She later said she remembered nothing of her labor after starting injections and does not remember birth of child.

Case II.—No. 47567. G. R., aged nineteen, married, white, para-i. Admitted to hospital 9.15 P. M., Oct. 29. Cervix four fingers, R. O. A. Pains strong, every five minutes. Fetal heart sounds, 130. 9.30 P. M., "Tocanalgine" 1.55 c.c. After thirty minutes patient still felt pain but not so strong. 10.50 P. M., "Tocanalgine" 0.75 c.c. Fifteen minutes later every three minutes but only slightly felt. Considerable bearing down. 12.05 A. M. Head on perineum. Patient does not scream. Does not suffer. Pulse 120, respiration 24, fetal heart 148. 12.50 A. M. "Tocanalgine 0.75 c.c. 12.55 A. M. pituitrin 1 c.c. Head now on perineum fifty minutes. Does not move. 1.05 A. M. Pains frequent. Patient bears down. Feels them but does not suffer. 1.25 A. M. Baby born. Weight 7 pounds 1 ounce. Breathed after eight minutes. Heart was at first slow but gradually improved. 1.37 A. M. Placenta expelled. Puerperium normal.

During labor there was no headache, nausea, thirst, or prickling sensations. Next day patient remembered having pains and bearing down but insists she had no suffering. Did not sleep throughout labor.

Case III.—No. 47555. H. B., white, aged 36, para-i, full term, normal measurements, L. O. A., married. Admitted to hospital 12 noon, Oct. 29. Labor having started at 6 A. M., she was after six hours dilated only two fingers. 2.50 P. M. Pains every four minutes, severe suffering, fetal heart sounds 120. 3 P. M. 1.5 c.c. "Tocanalgine", no pain from fifteen minutes after injection for over four hours, when some pain returned. Shortly after she received 0.75 c.c. "Tocanalgine" and slept all night. She seemed to be without uterine contractions.

Next day she received 1 c.c. pituitrin and as there was no more Tocanalgine she suffered severely for over an hour until child was born. During labor, patient was thirsty and passed increased quantities of urine. No nausea or prickling sensations. Baby weighed 8 pounds 6 ounces and breathed at once. Baby had a large hematocele over occipital region. Placenta came away ten minutes later. Puerperium was normal.

In offering you this report I realize that there has not been enough work done to draw any real conclusions and the comments I am about to make are few:

The drug certainly relieves the pain of labor and causes a certain amount of amnesia, probably by central action. It will probably be found to lengthen the second stage of labor. It is harmless to the mother and has no effect on the puerperium. There will be a certain number of babies born apneic. If this will prove serious enough to discredit the method I cannot yet say. After they once start to breathe they are as healthy as any other babies. It must, to prove safe and sane, allow the woman to deliver herself without the addition of another poison—pituitrin—in any appreciable number of cases.

Finally I would say that I consider the work sufficiently encouraging to warrant further experimentation and must say the results are much better than were our first trials with scopolamin-morphine. In the three cases on which we tried this drug all three babies were above average size and the cases were not ideal for first experiments. To repeat my verdict is that these experiments are extremely encouraging.

2 West Eighty-sixth Street.

THE NECESSITY OF THE STUDY OF FETAL HEART SOUNDS IN PLACENTA PREVIA.[1]

BY

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The fetal heart sounds are frequently difficult to make out. Increased quantity of amniotic fluid, the rapidly moving child, the uterine souffle or funic souffle, the fat-walled abdomen, often render the fetal heart sounds almost impossible to detect. When, however, we fail to hear them it is usually due to the fact that we are listening at the wrong part of the fetus or that the fetus is dead.

It is imperative that one should listen to the fetal heart sounds with reference to the anatomical position of the heart in the fetus without any reference whatsoever to the place where the sounds are usually heard on the woman's abdomen.

While the heart sounds are usually heard with greater intensity at well-known places upon the woman's abdomen, it is by no means certain that they will always be heard loudest there, because the baby so often changes its position. It is imperative that the exact diagnosis of the babies' position be established at the time one listens to the heart sounds.

If this rule is adhered to we have a standard by which we can tell whether the heart sounds are weaker than they were before, whether the sounds are accentuated, regular, or whether they differ from some previous case.

It is the heart of the fetus that we are anxious to hear and not any sound that may come from the mother's body. In consequence, it is imperative that we should, in listening to the heart sound, select that part of the fetus where the heart sound is heard most distinctly.

There are two portions of the body of the fetus where the heart sounds can be heard to best advantage: upon the chest in front at the location of the heart or upon the chest behind, over the location of the heart.

When we recall that the fetus in every instance, except in a face

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[1] Read before the Medical Society of Virginia as a part of a Symposium upon Placenta Previa at the Forty-fifth Annual Session held at Washington, D. C., October 27–30, 1914.

case or one of the modifications of it, has its head bent upon the neck, the neck upon the chest, and arms folded over the chest in front, and the legs folded over the abdomen in front, it is manifest that the place upon the mother's abdominal wall where the heart sounds will be loudest is where the middle of the back is nearest the woman's abdominal wall. In presentation by face or some modifications of this presentation the chest of the infant is pushed toward the uterine wall and in consequence the heart sounds are more audible at the point upon the uterus immediately over the chest.

In making a diagnosis of fetal position we should determine the exact location of the small parts, breech, head and back, so that we are able to put the stethoscope at the point where the heart sounds should be heard at best advantage, instead of determining the textbook position and of putting the stethoscope upon the place where the heart is usually heard loudest when the fetus is in that position. The exact location of the various parts of the fetus can be determined in but one way—by external examination. In transverse presentations as a rule the back of the infant is, as in vertex presentations, on the stretch and the point where the back of the fetus nearly approaches the uterus is the place to listen.

When the point of anticipated loudest sound is ascertained, then the stethoscope is placed at that point, the fetus is held as firmly as possible by one of the hands upon the woman's abdomen and the fetus' back is pressed against the stethoscope. If the heart sounds are not very audible at this point and are heard more distinctly at some other point, the diagnosis of the position originally made is incorrect or we are dealing with multiple pregnancy.

If we are able to push the baby up against the uterine wall and are not able to hold it there, then the accurate determination of the frequency and character of the heart sounds is made with difficulty.

In my own experience, the greatest obstacle to the accurate determination of the number and quality of the fetal heart beats have been the funic or uterine souffles which may be so loud as to entirely smother the sounds of the heart.

Zweifel, 1876, reported that he was able to demonstrate oxygen in the placental veins by means of a spectroscope.

Cohnstein and Züntz showed by chemical means there is more oxygen in the placental veins than in the arteries. As soon as the quantity of oxygen is cut down in the placenta the fetus has dyspnea.

Rosenthal calls the state in which the fetus does not have to exercise its own muscles in order to give off carbon dioxide and to receive oxygen, as fetal apnea. A breaking of the apnea comes at the time of birth when as soon as the fetus is born some of the placenta peels off, cutting down the oxygen supply and making the placental breathing difficult or impossible. This makes the fetus gasp for breath. This same condition is liable to arise in the uterus if the cord is compressed or the placenta peeled off, but instead of air the fetus breathes in amniotic fluid. Added to the lack of oxygen, we have the bronchi distended with a fluid that can be of no more service to the infant than it could be to us.

The serious consequences to the fetus in placenta previa is due to the fact that that portion of the placenta which is detached from the uterus does not receive from the mother the oxygen that it should receive and in consequence the fetus suffers with dyspnea.

From the standpoint of the child the sooner the case of placenta previa is delivered the better. If the placenta happens to be a big one with a large area attached to the mother, as is usually the case in placenta previa, and the part of the placenta that becomes separated from the uterus during the dilatation of the cervix is a small one, the infant frequently suffers no inconvenience at all. If the child begins to show evidence of breathing there must be considerable cutting down of the oxygen coming to it because, until it does suffer oxygen hunger, it will not begin efforts to breathe.

The signs of distress upon the part of the child are cessation of movements and some change in the heart sounds. The cessation of movements is the least important because all of us know perfectly well that under normal conditions when the uterus begins to contract and the circulations of the placenta in consequence is temporarily interfered with, active movements almost entirely cease. In fact, after a woman has entered into normal labor the fetal movements are so few that she often comments upon it and asks the physician if her baby is dead.

One hears fetal heart sounds during uterine contractions with difficulty.

The normal heart sounds of the infant while it is in health, vary from 120 to 140. We usually regard the heart beat below 100 or above 160 as indicating grave trouble on the part of the fetus. As a rule, where the infant is sufficiently oxygenated, heart beats of 124 or less, according to Frankenhäuser, indicate a boy and 144 or more indicate a girl. We cannot, however, with any certainty diagnose sex by fetal heart sounds for the reason that there are so many things that will interfere with the oxygenation of the fetus that cannot be detected by our methods of examination.

The frequency of the heart sound is very materially influenced by uterine pain. As a rule, the more advanced the stage of labor, the slower the heart sounds.

Schultze believes that this is due to the stimulation of the vagus by the insufficiently oxidized fetal blood; Kehrer believes that it is due to the compression of the skull by direct vagus irritation.

Possibly the contracting uterus itself, changing the character of the substances which transmits the heart sounds, has something to do with this, but more probably the reason for the muffling and slowing of heart sounds during uterine contraction is the fact that the uterus in contracting squeezes down upon the arteries passing from the uterine muscle bundles and temporarily stops the flow of oxygenated blood to the uterus. As evidence that this is probable, it is a fact that after the uterus has ceased to contract, the fetal heart sounds appear slow and rather inaudible at first and in a little while are heard a little more distinctly until they become normal again.

The changes in the fetal heart sounds before delivery incident to oxidation are changes in frequency, regularity, strength and rhythm. The sympathetic nerves when stimulated increase heart frequency; the vagus when stimulated slows the heart beat. When the vagus is paralyzed the heart sounds become extremely rapid. As a rule when oxidation is lessened the heart sounds are increased in frequency. As oxidation continues to be cut down, the heart sounds are reduced in frequency.

At this time we usually find accentuation of the second sound, and then the heart sounds stop entirely.

It is not unusual to find marked irregularity of the heart both in the slow phase and in the rapid phase.

The strength of the heart tone is likewise important. A strong first note denotes a healthy muscle.

My own experience has been that the well-accentuated sound is a more favorable prognosis than the rapid, irregular sound.

Summary.—1. Comparison of heart sounds can only be made when we examine the fetal heart at the point on the abdomen of the woman nearest the middle of the back or the chest of the fetus.

2. This may be accomplished only after the exact location of the back or chest has been determined by external examination.

3. From the child's standpoint delivery should be accomplished as soon as possible after the diagnosis of placenta previa has been made.

26 NORTH LAUREL STREET.

A PLEA FOR A MORE CONSISTENT ENDEAVOR TO DIAGNOSE TUBAL PREGNANCY BEFORE RUPTURE.

BY

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HUGGINS made the statement in the AMERICAN JOURNAL OF OBSTETRICS of November, 1911, that 80 per cent. of tubal pregnancy cases should be diagnosed before rupture. While my experience has not been as large as his, in 50 per cent. of my cases the patients presented themselves for diagnosis before rupture. Notwithstanding, there is no doubt that a dozen operations are performed after rupture to one performed before this catastrophe. Should we not reiterate again and again the early signs and symptoms, so that every practitioner may daily think of ectopic pregnancy when making a diagnosis of a gynecological or abdominal case?

The diagnosis is not easy, but it can be made positively in fully 90 per cent. of the patients, who present themselves to the physician.

The red letter points in diagnosis are the following:

1. A very careful history, to be immediately written down, of the patient's past history—and more particularly of her last three or four menstrual periods, should be obtained. In tubal pregnancy the last menstrual period has either been overdue for a varying time of a day or two to a month or so, or the normal menstrual period has been replaced by a more or less continuous leaking. This bleeding is usually continuous until tubal rupture or abortion takes place, or until the tube has been removed.

2. Cramp-like abdominal pains, at times becoming quite severe, are complained of, frequently attributed by the patient to some indiscretion in diet. This pain may be quite high in the abdomen, even in the epigastric region.

3. As first pointed out by Brickner, the crises of pain are frequently followed by a temperature of from 99° to 102°.

4. Rectal tenesmus or a mild diarrhea is frequently present, especially so, if the engorged tube should drop down in the posterior culdesac and rest on the rectum.

5. Bimanual examination should be made with every care to prevent rupture. The pregnant tube is tender and presents a doughy swelling, which, at times, is felt in the posterior culdesac, but may be quite far up and to the outside, almost beyond reach. Here it may surround and replace the normal ovarian situation. The rectum must be thoroughly cleaned of fecal residue before examination, as

the doughy tubal swelling might easily be mistaken for feces. This mistake came almost being made in my last case. Boldt has pointed out that the moving forward of the vaginal part of the cervix causes pain in the rectum. I have not observed this sign, invariably.

6. If the diagnosis should have sifted down to either a uterine abortion or tubal pregnancy, with the points possibly in favor of the first and a curettage indicated, that operation should only be performed in a well-equipped operating room, where every facility to enter the abdomen can be obtained, if the diagnosis should have to be revised when the patient is examined under ether. If the curettings from the uterus do not account for the continual dribbling, even if the bimanual examination under ether be negative, I believe an experienced gynecologist, having had the opportunity of seeing his patient occasionally beforehand and of weighing carefully her symptoms, etc., would be justified to either open the anterior culdesac, as Bandler advises, or to open the abdomen, in order to verify or not his suspicions.

In making a differential diagnosis we have to consider appendicitis, uterine abortion, salpingitis, ovarian cyst, cancer of the body of the uterus and normal pregnancy. In appendicitis, Murphy's pathognomonic signs, as pain, nausea and vomiting, rigidity, temperature and leukocytosis are present in the order given. In tubal pregnancy, rigidity is not present even if the tubal symptoms, which I enumerated, were present. In uterine abortion, the os uteri is open and the bleeding is brighter red and more profuse. The curettings are positive and the bimanual examination is negative. In salpingitis, the history of gonorrhea or sepsis associated with the signs of same and lack of sequence of the symptoms, as enumerated for ectopic are usually sufficient for diagnosis. In ovarian cyst the tumor is not doughy and replaces the normal ovary. In both salpingitis and ovarian cyst there must occasionally be a confusing case, but as both usually demand surgery, no great harm is done. The curettage in cancer of the fundus uteri will be diagnostic. With normal pregnancy we have not the typical tubal history or the sensitive doughly swelling.

While we know many cases of tubal abortion undoubtedly recover without operation, at the present time it will be safer for the majority of us, once we have diagnosed tubal pregnancy, to recommend surgery.

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BLADDER IRRITABILITY IN WOMEN.*

BY

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I HAVE invited your attention to this subject tonight because irritability of the bladder, as evidenced by frequency of urination and dysuria, is such a common complaint among women. It demands our study because apart from its possible painfulness it is a most annoying disorder curtailing the liberty of the individual and interfering with sleep. Furthermore, the complex etiology makes the problem one of peculiar interest.

Bladder irritability may arise from so many causes that urinalysis and cystoscopy should be routine procedures in such gynecological cases as present this symptom. While elaborate cystoscopic work must be done by the expert, the gynecologist of to-day must at least familiarize himself with the examining cystoscope; otherwise, causes of bladder symptoms will be misinterpreted or ignored. Instruments are now obtainable which enable such examination to be made in the office with little discomfort to the patient and with little trouble to the examiner. The instrument I have used with general satisfaction is the simple examining cystoscope of the Nitze pattern, number 15 French scale. The male length is preferable. This is provided with the Zeiss lens. Such a small caliber cystoscope may be readily passed in the most sensitive patient, and a brilliant, clear, corrected field is presented. A converter is necessary in the outfit and may be bought for $7.

Etiology.—Probably the most interesting feature of bladder irritability is its etiology. In considering this subject I shall exclude cases in which the irritability is due to frank acute inflammatory conditions of the urinary tract or are dependent on gross pathology in or adjacent to the bladder. In such cases the bladder symptoms are obviously secondary, and a consideration of them would involve an important discussion, but one not properly belonging to my topic. There are times when increased frequency of urination may

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* Read before the Brooklyn Hospital Alumni Club, 1914.

be accepted as practically a physiological condition. The congested trigone of the later weeks of pregnancy is common but seldom persistent. In some women frequency of urination occurs during the menstrual week but is confined to that brief period. In others, the sensitiveness of the bladder is abnormally increased by cold, and psychic and sexual disturbances. The cases which most often become our problems are those complaining of long-standing irritability in which urinalysis is normal.

Trigonitis.—One of the most frequent causes of bladder irritability in women is chronic, local cystitis involving the trigone. Chronic trigonitis may exist simply as a congestion of this area, or a low-grade colon bacillus and, less frequently, a staphylococcus infection may be present, involving the superficial layers. Text-books usually state that trigonitis is an end result of acute cystitis. In my experience this is not true. More often there is no history of previous bladder trouble. A very frequent exciting cause is incomplete emptying of the bladder; this is generally conceded to be the effect when cystocele is present. Frequently, when cystocele is not noticeable in the dorsal position catheterization will demonstrate residual urine and examination in the standing position will show a sagging bladder. The trigone by its position and partial fixation is peculiarly exposed to trauma and contamination in the female and its rich nerve and blood supply make it sensitive and susceptible to infection. The trauma incident to operation and catheterization often results in trigonitis or posterior urethritis. I have never been able to prove clinically that the gonococcus is responsible for chronic trigonitis nor has pathological examination shown it. In some instances it may be that an acute inflammation predisposes this area to the more chronic infections. Continued hyperacidity of the urine, due to lessened water intake or errors in diet, is occasionally found in cases where other factors are not discovered, and this fact should be noted in the history and in the urinalysis as one of the items to be reckoned with. In adolescence friction of the external genitals may be an exciting cause.

When inflamed, the natural redness of the trigone is intensified, it bleeds easily on the slightest touch of the cystoscope, and the out-standing blood-vessels converging at this point are lost to view in the diffuse redness. At times minute vesicles appear on the surface at the bladder neck. There is a rare type of trigonitis in which yellowish-white areas appear in the congested region. The last-named cases seem intractable to any form of treatment. Commonly, however, chronic trigonitis responds readily to instillations of silver nitrate preparations. The two-way* catheter of Dickinson is especially serviceable in treating this condition. The bladder is emptied and an injection may be made with but one manipulation. To be most highly effective the subsequent emptying of the bladder should be deferred at least an hour after the injection has been made. In cases of bladder prolapse the organ must be supported by operation or pessary or relapse may occur.

There is a condition occasionally met with which causes mild irritability of the bladder and which cannot properly be termed trigonitis. It may more correctly be called varicosity of the trigone. The patients with this condition are always free from irritation when lying down. On cystoscopic examination the veins of the trigone may be seen and the degree of their distention varies with the position of the patient. Some of these cases are amenable to treatment which supports the bladder base, but applications to the bladder base are of course useless. When measures directed to the relief of trigonitis are not followed by improvement examination may reveal that chronic posterior urethritis is the condition causing persistence of the symptoms.

Posterior Urethritis.—Posterior urethritis is frequently associated with trigonitis, especially in those cases where residual urine is not the etiological factor. It may be present as an independent condition and endoscopic examination of the urethra should be part of the routine investigation of all cases of bladder irritability. (For this purpose I use the Furniss endoscope made by the Wappler Company of New York.) Posterior urethritis is recognized by the brilliant streamy red and easily bleeding condition of the mucous membrane of this part of the urethra. The degree of inflammation may vary from simple congestion to evident infection. Women unlike men, seldom develop posterior urethritis from acute infection of the urethra; more frequently it is insidious in onset, chronic in character, and the persistence in some cases is doubtlesss fostered by chronic infection of Skene's glands by the colon bacillus or gonococcus. Women, as well as men, may develop an irritability of the posterior urethra, which is shared by the bladder, due to frequent periods of prolonged eroticism.

Irritations about the Meatus.—Bladder irritability may arise from irritating lesions about the meatus. Chronic infection of Skene's glands may be the focus of such irritations. When the gland is visible externally it is seldom overlooked. But in some instances the presence of such inflammation will be unnoticed unless the meatus

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* *American Journal Urology*, June, 1912.

be everted by the finger tips. This inflammation is very persistent and cure is most readily brought about by direct application of the cautery. The treatment of this condition was discussed in a previous article.*

Eversions of the mucous membrane of the urethra, conditions simulating hemorrhoid, and caruncle may all be exciting factors in bladder irritability. Under these circumstances painful urination is a more pronounced symptom than frequency. It should be said, however, that chronic inflammatory conditions may exist at the meatus with surprisingly few bladder symptoms, and their presence cannot be definitely accepted as the cause until other possible factors have been excluded.

Association with Other Pelvic Lesions.—Physicians who do not make examinations of the bladder and urethra a part of their routine procedure often assume that bladder irritability may be attributed to any lesion, major or minor, which may be found to exist in the pelvis. Study has led me to conclude that such lesions are seldom directly influential, save in those acute conditions when exudates in the cellular tissues of the pelvis involve the bladder structure or make pressure upon it.

Neuroses.—Bladder irritability is often considered a neurosis, but careful study will disprove this assumption. When existing as a so-called neurosis, frequency of urination is the only symptom and will not be present to the extent of disturbing sleep, though it may be troublesome when the patient is lying awake. In typical cases it annoys the patient chiefly if proper conveniences are known to be lacking or if any unusual excitement is experienced. To be considered a true neurosis other symptoms are present which aid in the diagnosis, and examination will exclude such causes as have been enumerated above.

Tuberculosis of the Kidney.—This subject should not be closed without referring to bladder irritability as a symptom of incipient tuberculosis of the kidney. While it is commonly understood that tubercular infection of the kidney is manifested by pus and blood in the urine, in early cases of cortical infiltrations these may not be detected and frequent examinations of catheterized urine should be undertaken in the study of these obscure cases. If at times small amounts of pus are found, irritability may be dependent upon a common cause, either early tubercular infection or nephritis.

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* Cary: Conservative treatment of gonorrhea in women, *Am. Jour. Surg.*, December, 1911.

CONCLUSIONS.

Bladder irritability *per se* excludes acute inflammatory conditions of the urinary tract and conditions which may be considered as physiological and concerns cases of frequent urination and dysuria in which urinalysis is normal.

Contrary to the usual teaching, trigonitis often exists without history of previous bladder trouble. The presence of cystocele, evident only when patient is standing or sitting, may prevent emptying of the bladder and cause an irritating residual urine which acts as exciting cause. The location of the trigone makes it peculiarly sensitive to trauma and infection, hence the irritations following operation and catheterization. Continued hyperacidity of the urine and friction of the external genitals may be contributing causes. Chronic trigonitis usually responds readily to instillations of silver nitrate, and the two-way catheter is used most successfully in treatment.

Posterior urethritis exists much oftener than is commonly stated. It is easily recognized in endoscopic examination. Women seldom develop posterior urethritis from acute infection but it may be rendered persistent by infection of Skene's glands with colon bacilli or gonococci. It may be excited by prolonged eroticism.

Irritability may arise from lesions about the meatus and here inflammation may be persistent but usually yields to direct cauterization.

Eversions of the mucous membrane of the urethra, conditions simulating hemorrhoid, and caruncle may all be exciting causes but may also exist without giving rise to bladder symptoms.

Association with other pelvic lesions is seldom influential in bringing about bladder irritability except in circumstances that involve the bladder structure or cause pressure upon it.

Bladder irritability may rarely be considered a pure neurosis. Repeated examinations of the urine may disclose a cause for irritability in nephritis or in a tubercular infection of the kidney.

38 CLINTON STREET.

TRANSACTIONS OF THE AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS.

Proceedings of the Twenty-seventh Annual Meeting held at Buffalo, N. Y., September 15, 16 *and* 17, 1914.

The President, CHARLES NORTON SMITH. M. D., *in the Chair.*
(*Continued.*)

THE KINETIC SYSTEM AND THE TREATMENT OF PERITONITIS.*

BY

GEORGE W. CRILE, M. D., F. A. C. S.,
Cleveland, Ohio.

Introduction.—It is my purpose in this paper to present a new explanation of the phenomena which accompany peritonitis and to outline the treatment suggested by this conception. In the abdomen the leading symptoms of peritonitis are pain and tenderness, distention, muscular rigidity, intestinal paresis, vomiting. In addition to these local disturbances there are also the general symptoms of infection—accelerated pulse and respiration, raised blood pressure, fever, and rapid loss of strength and weight. I postulate that these are all adaptive phenomena—that is, that each individual phenomenon of peritonitis has been evolved for the good of the individual. In other words, the whole process is for the purpose of defense against injury just as truly as physical fighting is for the purpose of defense against attack. In like measure physical fighting and the body's defense against peritonitis are dependent on the transformation of potential energy into kinetic energy, this transformation being effected by the kinetic system. In peritonitis as in the case of a physical attack the defense may require so rapid and so extensive a transformation of the body's stores of energy that exhaustion, or death even may follow. It follows, therefore, that in peritonitis as in fighting or in any form of physical exertion safety may lie in the control of the kinetic system.

Analysis of the Phenomena of Peritonitis.—As the abdomen has

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* Read before the American Association of Obstetricians and Gynecologists at Buffalo, N. Y., Sept. 15–17, 1914.

within it a germ-laden intestine, and as it was a part of the body that was frequently wounded in man's phylogenetic struggles with his environment, the peritoneum, perforce, through natural selection acquired a remarkable power of self-defense against the consequent infections. As an infection is most readily spread and increased by movement, immobilization is the prime requirement in overcoming an infection. Within the abdomen this immobilization is accomplished (*a*) by inhibition of the intestines; (*b*) by distention of the intestines; (*c*) by rigid and persistent contraction of the abdominal muscles and (*d*) by the exudation of a sticky glue-like material. The infected point in the peritoneum may therefore be completely fixed (*a*) by paralysis, (*b*) by distention, (*c*) by rigidity of the abdominal wall, and (*d*) by gluing. On account of the intestinal inhibition, digestion and absorption cease and anorexia and vomiting follow—self-protective measures which have been evolved against the danger from poisonous broken-down food.

We see, therefore, that the paralytic distention of the intestines, the muscular rigidity of the abdominal walls, the anorexia and the vomiting which accompany peritonitis are natural adaptations for the purpose of localizing and overcoming the infection. As for the pain and tenderness they are part of the protective mechanism and play their rôle by forcing the body to maintain a box-like rigidity of the abdominal portion.

When the abdomen is rigid it can no longer play its important respiratory rôle, and the respiratory movements are confined to the thorax—in fact, the lower thoracic movements also are inhibited since the movable ribs are fixed on the abdominal side. As the lungs are but partially filled, the respiratory rate is increased to compensate for the diminished volume of the exchanged gases. The diminished respiratory movements of the lower chest induce vascular congestion; vascular congestion induces pleurisy and pneumonia.

The loss of water by vomiting, the diminished intake of water, and the failure of water absorption cause a rapid shrinkage of the soft parts which is especially noted in the face, while the increased blood supply to the intestines combined with the diminished intake of water causes a rapid diminution of the pulse volume. The loss of water is followed also by a diminished volume of urine. At the same time metabolism is increased, there is an increased concentration of solids which cannot be eliminated by the kidney handicapped as it is by the diminished urinary output. The skin in turn, therefore, is forced to attempt by increased activity to compensate for the renal insufficiency.

We see, therefore, that the *characteristic* phenomena of peritonitis are as natural as the phenomena of walking, running or fighting. The increased pulse and respiratory rate and the fever are characteristic not of peritonitis alone but of all infections. They are the result of the *forced* conversion of potential energy into kinetic energy as a defense. This defense also is an adaptation developed in the body by natural selection and is the means by which foreign proteins—infection products—are broken down.

The Treatment of Peritonitis.—If the body-wide disturbances caused by peritonitis are adaptations for defense, then we must conclude that death is caused by an excessive discharge of the body's store of energy in maintaining this defense. Our problem, therefore, must be to discover some means by which the method of defense evolved by nature may be maintained, while at the same time the energy of the body is conserved as far as possible.

The evidence upon which we base our postulate that the excessive transformation of potential into kinetic energy is the cause of death in peritonitis points the way to the method by which the energy may be conserved:

(*a*) In experimental researches my associates (Drs. J. B. Austin, F. W. Hitchings, H. G. Sloan, and M. L. Menten) and I have found that infection produces in the brain, the suprarenals and the liver histologic changes which are identical with the changes which are characteristic of exhaustion from any cause—running, fighting, trauma, etc. Exhaustion from any cause, as we have shown elsewhere, is invariably accompanied by widespread histologic changes in these three organs—the brain, the suprarenals, and the liver—these changes, according to the degree of exhaustion, varying from slight hyperchromatism through stages of chromatolysis to a final stage of disintegration.

(*b*) Our experimental researches have shown us also that deep morphinization prevents the histologic changes which are characteristic of the excessive conversion of energy—that is, of exhaustion.

Not only is the conversion of energy excessive in cases of peritonitis but, as we have stated already, the intake of energy in the form of food fails so that the stores of energy are depleted with great rapidity, while the action of the kinetic system is still further impaired by the loss of water equilibrium.

These facts point the way to two prime requisites in the treatment of peritonitis—(*a*) the conservation of energy by the use of morphine and (*b*) the maintenance of the water equilibrium by the Murphy rectal drip.

Morphine not only protects the organs but it also aids in promoting the efficiency of the defense mechanism within the abdomen—for deep morphinization of itself causes inhibition of the intestine; immobilizes the patient as a whole; prevents pain; and holds metabolism practically at a standstill. Under deep morphinization but little food is required; the brain, suprarenals, and liver are protected; and the intestines are immobilized while the phagocytes overcome the infection.

That deep opium narcotization is an efficient treatment for peritonitis was well known to the older clinicians, especially to Alonzo Clark and to Flint, who gave opium until the respirations were far below normal, as low even as ten or twelve per minute.

The appearance of these patients would seem to indicate that they are perilously near death; in reality, they are in a condition which closely resembles hibernation, and which continues until the local immunizing forces overcome the infection.

In cases of appendicitis with spreading peritonitis the surgeon should never in the whole scheme of treatment lose sight of this prime need of protecting the kinetic system from exhaustion. The administration of morphine should, therefore, begin at once. Nitrous oxide is the inhalation anesthetic of choice as ether by dissolving the lecithin in the phagocytes causes a weakening of the body's defense which may last from twelve to twenty-four hours—a break in the defense which may cost the life of the patient. The operation is performed under anoci-association, the local field being blocked as far as the zone of the actual infection.

Morphine is continued during and after the operation as it is required to conserve the patient's energies. My associate, Dr. Lower, and I have employed this method in 391 cases of acute appendicitis with but two deaths.

We may define peritonitis as the adaptive phenomenon manifested by the kinetic mechanism in maintaining a defense against an infection of the peritoneum, and we find that the kinetic theory supplies a consistent explanation of the phenomena of peritonitis and also a true index to its successful treatment.

Osborn Building.

DISCUSSION.

Dr. J. Henry Carstens, Detroit.—As one of the older men in the profession, I have always had great admiration for Alonzo Clark and his method of treatment. During all these years, in spite of the opposition to opium, I have still clung to the Alonzo Clark treatment. I have had many cases of peritonitis that would have died if operated on and have put them under the Alonzo Clark treatment. The Alonzo Clark treatment was not simply the use of anodynes. I firmly believe that you will have a great deal better effect from the real, original *powdered opium or gum opium* than from morphin.

From pure opium you will have a beneficial effect that you would not get from morphin alone. If you cannot get this and give it, you must give enough morphin, but I have practiced in accordance with the plan laid down by Alonzo Clark. You hardly can give too much. I have seen house physicians throw up thier hands in horror if they saw me give a grain of morphin every hour, or something like that, but I can assure you that it is all right.

DR. FRANK D. GRAY, Jersey City.—I want to say one word. It is most delightful to have Dr. Crile throw such scientific illumination upon the good things of the old empirical times.

DR. WILLIAM H. HUMISTON, Cleveland, Ohio.—I have been very much pleased with this paper. It is an important contribution, and I think the conclusions are absolutely correct. I have for three years been taking these cases of acute peritonitis and waiting until subacute, before operating. In the meantime giving them opium, to control peristalsis with ice bag to abdomen.

One important point the essayist spoke of was the contraction of the muscles of the abdomen, holding the viscera quiet, aiding the opium. I further aid this by the use of the ice bag which will contract these muscles, and with opium, hold over these cases to a time when you can operate safely. I would call Dr. Crile's attention to a case we both saw recently. I refused to operate, put her on the ice treatment. Friends became restless and Dr. Crile was called on. He properly refused to operate and advised to keep on with the treatment. Operation seven weeks later, and the woman recovered. It was a desperate case as Dr. Crile will remember. I have had many cases of this kind in the past year and a half, and my experience confirms everything that Dr. Crile has said to-day.

DR. JULIUS H. JACOBSON, TOLEDO, OHIO.—I would like to ask Dr. Crile if the Alonzo Clark treatment is used before operation or after the patient has been operated. I think that is very important.

DR. A. B. MILLER, Syracuse, New York.—It is interesting to find Dr. Crile has reached his conclusions after a scientific study of the subject. It is the consensus of opinion of those members of the profession in New York who are familar with the method of treatment carried out by Dr. Alonzo Clark, that his original work was not accurately reported; that the interns associated with Dr. Clark at the time felt that the better results were obtained by means of catharsis and that it was really the treatment to be carried out, and it is probable in the investigation of Dr. Clark's method we have not been furnished with a true statement of the treatment as it was carried out by him. Gill Wylie was an intern at the time and he says the line of treatment by catharsis was adopted and the most favorable results obtained.

DR. CRILE (closing).—In answer to the question of Dr. Jacobson, I will say that we operate on every case at once.

I remember the case to which Dr. Humiston has referred very well, and it was a splendid triumph for Dr. Humiston. I think if Dr. Humiston had used cathartic treatment he would have lost his patient. Don't you think so?

DR. HUMISTON.—Yes, I do.

Dr. Crile.—What we do is this; as soon as a patient arrives at the hospital, she is carried in a propped up position from the ambulance, the Fowler position being used, and is taken into the hospital and brought to the operating room. We operate immediately under nitrous oxid. If it is an appendix case we take out the appendix if we can, but we do not push the operation. It may be necessary to drain for a short time. If the patient is very sick we give the Alonzo Clark treatment, but not if the patient goes along smoothly, that we may save some of the worst cases that otherwise would succomb.

As to the remarks made by Dr. Miller, I have no definite knowledge of the Alonzo Clark treatment, as it is understood by the New York men. I wish I had.

ECTOPIC PREGNANCY AND THE GENERAL PRACTITIONER.*

BY

BENJAMIN RUSH McCLELLAN, M. D., F. A. C. S.,
Xenia, Ohio.

That extrauterine pregnancy is far more common than is generally recognized requires little argument. Hunner records thirty-six cases in 3300 patients examined in the gynecological service at Johns Hopkins Hospital, and in a series of 2100 private cases of pregnancy he found thirty-four ectopics.

In a community well known to the writer, there are forty-eight able general practitioners, very few of whom have ever reported a case of extrauterine pregnancy; however, two of their number each report from two to five cases every year. In this same community there have been a number of deaths, and many chronic invalids reported to have had pelvic hematocele and pelvic abscesses following abortion, many of which were primarily, no doubt, overlooked extrauterine pregnancies.

The writer feels sure that the time has come when the general practitioner will be held responsible for an early diagnosis in these cases as well as in appendicitis and other well-known acute abdominal diseases. Are not members of this and similar organizations to blame, in part, in that there has not been a definite and clearly established "symptom-complex" that would enable the general practitioner to make a reasonably early diagnosis?

I quote further from Hunner who, in commenting on the fact that early diagnosis of ectopic gestation is not always easy, says: "there is no serious intraabdominal condition which has the diagnosis

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* Read before the American Association of Obstetricians and Gynecologists at Buffalo, Sept. 15–17, 1914.

written all over its face more clearly than has extrauterine pregnancy, and at the same time there is no condition which has been more often overlooked."

Of first importance is a careful case history. This should reveal at once any record of previous pelvic disorder. Mackensie, of London, says that at least 16 per cent. of all cases give such a history. This is easy to understand when we remember that the recognized etiological factors are, according to Keyes, "inflammatory diseases which leave impaired functionating mucosæ and impaired peristalsis; conditions which offer mechanical obstruction to the gaining of the uterine cavity by the ovum, as tumors, kinks, strictures, occlusions, etc.; dense adhesions of the tube to the ovary, uterus, broad ligament, or intestines, which distort the lumen of the tube; congenital malformations, especially diverticula of the lumen where an ovum is likely to be arrested; and uterine myomata." The history of a long period of sterility is quite common and would naturally make us suspicious of a previous pelvic pathology.

Cessation of menstruation occurs in about one-half of the histories, and in itself will not often send the patient to a physician. However, if the patient should mention the fact that the missed period was followed by an unexpected and unnatural appearing flow, it should arrest attention at once, especially if the flow is described as dark in color, more or less ropy rather than clotted, and accompanied by keen pains.

Nausea and morning sickness are not often noticed during the early weeks of pregnancy, and therefore, are not very helpful signs; however, there is a small number of cases accompanied by vomiting, in which the history of previous inflammations about the appendix might throw one off guard, thinking it was an acute recurrent attack of appendicitis.

Changes in the vaginal mucosa and the cervix uteri are less pronounced than in uterine pregnancy. The uterus is somewhat enlarged, but is not equal to that of the normally pregnant uterus at the same period of gestation.

Probably the most important sign is the finding of a *small, very tender mass* between the uterus and ovary, associated with intermittent pains, sharp in character, which radiate from this point to the back and thighs. Huggins calls attention to the fact that "traction of the cervix usually produces great pain." This test has never been tried by the writer, but it commends itself as a valuable aid, taken of course in conjunction with other symptoms.

Out of the foregoing enough should be recorded to enable the general practitioner to form a fairly clear clinical picture of an ectopic pregnancy before rupture, which should lead to prompt surgicar intervention with a prognosis as good as an *adinterim* operation fol appendicitis.

Huggins thinks that at least 80 per cent. of all cases coming to the general practitioner should be diagnosticated before rupture; certainly this is far from true at the present time. He further says that not more than 70 per cent. of women seek advice before rupture. Surely some effort should be made to instruct women as to the importance of noting even slight deviations from normal during the first weeks of pregnancy.

Unhappily a certain large percentage of cases are not diagnosed until the tube ruptures. This may occur at any time from the second to the fourteenth week, but is most apt to occur during the second month. This symptom is sure to be ushered in by a severe lancinating pain, quite unlike anything before experienced. So distinct is it that one who has once had the experience has been known to diagnose her own condition when a recurrence has taken place on the opposite side. This is followed by less severe but colicky pains, and more or less uterine hemorrhage. At this stage a diagnosis can usually be made without much difficulty, and without a vaginal examination. Indeed this last is contraindicated immediately after rupture, lest the newly formed clot should be disturbed.

It seems most desirable that an established propaganda should be formulated which would serve as a guide to the treatment to be followed in this so-called "tragic stage." It will not do for some to adopt the rôle of "watchful waiting," while others say operate as soon as a diagnosis is made. It seems to the writer that surgeons do not differ so much in what they themselves do as in what they say should be done. If the general practitioner takes the dictum "to wait" seriously, he will delay the calling of a surgeon, on the assumption that a fairly large per cent. of cases get well without operation, which, of course, can only result in a needless loss of life.

On the other hand, there is sure to be unnecessary risk taken if every case that has gone on to rupture is operated regardless of the state of collapse, and without waiting for the helpful effects of wisely selected treatment, which will of course include perfect rest with morphine wisely given, warmth to the body, and careful stimulation of the vasomotor system with small doses of strychnia, remembering that salt solution infusions should not be given until hemorrhage has completely ceased. It seems equally clear that if called to a case where hemorrhage is persistent, quick operative intervention is advisable, as offering by far the best results. If hemorrhage has evidently ceased, then the operation can well be done without haste. Indeed, if the environment is not favorable, time may be taken to change this, or even transport the patient carefully to a hospital.

In view of the fact that approximately one in five of the women who have extrauterine pregnancy on the one side have a recurrence on the opposite side, the question of prophylaxis is very important and should be settled by discussion in this and similar organizations. It seems quite clear that if the woman is young, and the opposite tube is, to macroscopic appearance, healthy, then the surgeon's duty is to preserve it. If the woman is near the climacteric, and there is any doubt as to the health of the remaining tube, it should be removed. But there will be a variety of conditions between these extremes that will present more difficulty of solution, in which it seems to the writer that the patient and her husband should have the deciding voice.

Finally, the writer would like to emphasize the value of the operating room as a teaching place where the general practitioner can be given most impressive instructions in pathology as it occurs in the living body. In no other way can the clinical picture be fastened so well in the observer's mind. Here are four recent experiences which illustrate some of the different phases in diagnosis and treatment.

Case I.—Mrs. H., thirty-six years old, four children, the youngest nine years old, no miscarriages. First confinement very difficult, requiring instrumental delivery, followed by a tedious recovery, with persistent pain in region of the right ovary. Menstruation quite regular till finally one period was missed, and at the end of six weeks she had an unexpected flow of dark ropy blood accompanied with sharp stinging pain on the right side. The family physician prescribed rest in bed. The flow stopped for two weeks, then recurred. About this time there was a chill followed by fever and profuse sweating. In this condition, with pulse 120, temperature 101°, she came into the hospital under the writer's care. Vaginal examination revealed a firm dense mass filling Douglas' culdesac; no fluctuation, and no fluid could be reached per vaginam. The abdomen was opened and emptied of a very large, firm, but foul clot. Free drainage was made both above and below, and the patient made a slow but excellent recovery.

Case II.—Mrs. T., twenty-eight years old, married seven years; never before pregnant; menstrual life began at fifteen, always painful and irregular; amenorrhea for two months, at which time she had, first a sense of fulness and uneasiness low in her pelvis which soon amounted to a pain so severe that she called in a physician who put her to bed and gave morphine. Her condition continued with varying degrees of pain till at the end of the tenth week she was awakened at 3 A. M. by a severe sharp cutting pain. Her physician found her in extreme collapse, from which she was sufficiently recovered in a few hours to allow of careful transportation to hospital. Soon after her arrival, a fresh hemorrhage occurred, pulse 140, anxious expression, skin pale, cold and clammy. Abdominal section was quickly done, vessels secured, saline infusion given, rapid emptying of clots and fresh blood with small fetus; wound closed without drain. Rapid recovery; patient leaving the hospital on the sixteenth day.

CASE III.—Mrs. B., forty-one years old; married at sixteen; two children, the youngest sixteen years of age, miscarriage four years ago; four weeks after last period, while away from home on a visit, had sharp pain and a very slight discharge of blood. This occurred in the night; did not call a physician; by morning she was enough better to ride home in the auto, a distance of forty or fifty miles; two weeks later, an unusual dark flow began, and continued with a little pain for two weeks, at which time a very severe pain necessitated the help of her physician who quieted her pain with morphine and sent her to the hospital. Patient was in good condition; pulse 96, temperature normal. Diagnosis ectopic pregnancy. Usual abdominal section on the following day revealed a large hematocele completely filling the opened out broad ligament on the right side. It was easily removed and the patient made a very prompt recovery.

CASE IV.—Mrs. T., thirty-six years old; married fourteen years; three children, the youngest six years of age; no miscarriages. No history of pelvic disorders; menstruation quite regular till about six months ago when the flow was very scant and there was sharp pain in region of left ovary followed by persistent sense of fullness and weight in same region; was unable to be on her feet long at any time. August 6, she had a sudden very severe pain in this same left side, very low, with desire to go to stool. In a few days there was a chill followed by high fever and profuse sweating, extreme prostration, pulse 140 and feeble, temperature 103°. Douglas' culdesac and left iliac fossa filled with firm mass; no fluctuation. Drainage through posterior fornix was unsatisfactory, whereupon abdomen was opened and revealed a large disorganized hematocele which was so badly broken down that no attempt was made to remove it. But very free drainage was established, one per vaginum, one through lower end of abdominal incision. Immediately the patient began to improve, pulse and temperature reaching normal on the third day, and at the end of four weeks the patient left the hospital.

Cases I and IV are reported as overlooked extrauterine pregnancies which became infected and thereby not only placed these lives in greater jeopardy but added greatly to the chance of unnecessary invalidism—contrary to the accepted rule the abdomen was opened in each of these infected cases. This was done because of inability to secure satisfactory drainage per vaginam. Case II illustrates the importance of prompt intervention where hemorrhage persists. Case III was a typical hematocele due to the pregnant tube rupturing into the broad ligament, and which, recognized early, was easily removed, and thus stands quite in contrast to Cases I and IV.

7 East Second Street.

DISCUSSION.

Dr. Julius H. Jackson, Toledo, Ohio.—The point in the discussion of this paper which we should emphasize is, to impress the general practitioner with the fact that there are two clinical courses for ectopic pregnancy, first the classical type which I think every general practitioner recognizes, and secondly that there is an atypical type which is not as a rule recognized. If we ask a general practitioner what the classical signs and symptoms of ectopic pregnancy are, he usually knows; but if we ask him something about the atypical types he knows very little about it, for this reason, we as surgeons get the impression that ectopic pregnancy must occur much more frequently than is indicated by the number we operate upon.

The atypical cases from a pathological standpoint come under the form of the old-fashioned tubal abortion, that is, little hemorrhages which come out through the fimbriated end with the formation of hematocele or hematoma. There must be a great many cases of unrecognized tubal abortion or pelvic hematoma which go on to absorption and recovery of the patient.

Dr. William H. Humiston, Cleveland, Ohio.—I merely rise to commend this paper and the clear points brought out in connection with the diagnosis. We cannot emphasize too much the importance of a good, clean cut history. A carefully obtained history, supplemented with a pelvic examination will readily clear up these cases.

I wish to report an unusual case which gave me a great deal of concern, and one in which I was in doubt as to proceeding, or whether to refuse operation under patients restrictions. A woman, married five years, came to me four years ago. I found on examination she had a retroverted uterus, an enlarged cystic right ovary, with evidences of chronic appendicitis. I did a curetment, opened the abdomen and removed the appendix, and also removed the right cystic ovary. The left ovary was also partly cystic but not so large. I resected that ovary, leaving about one-half of the organ, carefully uniting the cut edges with fine catgut, and to close did a Gilliam operation. Following these operations, her backache disappeared, and her headaches and indigestion were relieved. She gained 20 pounds in weight. About three months ago, she was taken suddenly with pain in left iliac region. She had missed one menstrual period. A physician was called, who did not make a diagnosis. To relieve the pain he gave her morphine and applied hot applications. As she was no better the next morning, she called in a brother, who was a surgeon, and he suspected extrauterine pregnancy, with threatened rupture, and advised operation. She decided that if she had to undergo an operation she would go back to the hospital and have me do it. Accordingly, she was brought to the hospital in an ambulance; her pulse was not over ninety and temperature was normal. She had no usual symptoms of hemorrhage, but on examination I found a boggy mass to the left and the uterus was deviated a little to the right. I diagnosed a ruptured ectopic pregnancy and advised an operation at once. She said to me, "that means the loss of my ovary; you have taken out one and I can never have any babies. Her husband would not consent to an operation unless I could save the tube and ovary, so that she might have a child. I thought it over and told them I would make the operation, control the hemorrhage, and if possible save the tube and ovary. On opening the abdomen fully a quart of blood was found in the lower pelvic cavity, which was removed. The tube was uncovered, and it was slit on the superior surface for an inch and a half, and the ovum partially protruding and still bleeding was easily removed. The ovary was covered with clotted blood. I uncovered it and it looked fairly well. I placed a probe in the fimbriated end of the tube, and with No. o catgut I carefully united the ruptured tube with two layer sutures. I was some nervous about it. I put the patient to bed, put on an ice-bag, and she has made a splendid recovery. I hope that I may be able in the next year or two to report to you that she has become pregnant and delivered of a normal child.

Dr. Hugo O. Pantzer, Indianapolis.—I am sure this forceful presentation of this subject will impress upon the general practitioner the importance of differentiating in intraabdominal lesion the inflammatory from the noninflammatory affection. In doing this the rectal temperature should be taken as meriting the quality of a real guide. In the acute stage of appendicitis, notably gangrenous appendicitis, the oral temperature may be normal or subnormal, while the rectal temperature will show an elevation at times of two to four degrees above that of the mouth. Thus the finding of increased temperature at once differentiates the case from one of bursted tubal pregnancy, which latter goes without temperature, at least until the extravasated blood undergoes infection and absorption.

I have attempted conservation of the tube by amputating the involved distal end and stitching the margin of the retained end to the ovary.

Dr. Albert Goldspohn, Chicago.—I am heartily in accord with what Dr. Jacobson has said, that we should educate the general practitioner who brings these cases and let him appreciate the difference in pathology between a tubal abortion and a ruptured tubal pregnancy, because it makes the biggest possible difference in the severity of the symptoms. I am not altogether decided in my mind positively that we should absolutely operate at once every one of these extremely bad cases of real rupture, particularly where the patient is pulseless, the temperature normal or below normal in the rectum. The fact that a great majority of the tubal pregnancies get into the hands of gynecologists after they have been carried for a day or longer for various reasons, is an important one, as we see the patients first after they are in the hospital. Bleeding may have stopped in many of them. They are not pulseless. We can make a diagnosis of tubal pregnancy and may not be altogether certain that there is not an abscess. The majority of cases we get come to us when the bleeding apparently or really has stopped, and the patient would not die with good medical care, the use of opium, etc. They would not get well; and operation would have to be done later, in most of them, but they would not die now. On the other hand, I know personally of two deaths, both of which occurred over twenty years ago, not under my care, but under my observation as consultant. These patients died in their homes. Nothing was done to them. They simply expired from hemorrhage, so that death is possible. We cannot assume that the natural course of the thing does not kill. Within one week, five weeks ago, I had two cases, both of which were pulseless. Nobody could make out any pulse on the operating table, and they had all the other conditions that go with severe internal hemorrhage. I operated at once and as quickly as possible, instituted vaginal drainage to close the anterior wound. These cases rallied; they had a pulse within six hours after operation, and did all right after that. I rather favored that as the correct thing to do, since we know that intraperitoneal bleeding is not always from tubal pregnancy, but it comes from a ruptured corpus luteum or a degenerating follicle, and sometimes from varix of the broad ligaments. If these are the conditions and it is not tubal pregnancy, the chances of the patients dying may be even more than from tubal bleeding. So inasmuch as we are not absolutely certain in many cases whether it is really tubal pregnancy or some other sort of bleeding that may not stop spontaneously, I have operated on these cases at once provided they can be gotten into the right place. I do not think it is wise to operate on these patients in their homes amid unhygienic surroundings.

Dr. Frank D. Gray, Jersey City.—I wish to cite a matter of record which I think throws a bright light on this somewhat unfortunate condition. A few years ago Dr. Philander A. Harris, of Paterson, New Jersey, reported at the State Medical Society twelve consecutive cases of removal of unruptured tubal pregnancies. Some one was skeptical as to how he really knew they were pregnancies, and he volunteered to have them sectioned before the next annual meeting. This was done, and a report from a competent pathologist was that they all proved to be real tubal pregnancies. This shows the alertness not only on the part of the surgeon but inferentially on the part of the general practitioners who referred these cases to him.

In the next place, I wish to call attention to the fact that we must not allow evidence of recent intrauterine abortion to blind us to the possibility of a coincident tubal pregnancy. In the last two years I have had two cases referred to me with a history of intrauterine abortion within the previous two weeks, and in both cases, on operating, I found tubal pregnancy, so that these things do occur, but not often. The lack of typical symptoms should be borne in mind. Recently a woman presented herself to me who had been for three weeks under the care of a man who is rated as a good general practitioner. She had had a more or less constant, but slight, hemorrhage from the uterus. During that time he treated her for "ulceration of the uterus." He had gone on his vacation, and he said that if this did not subside within a week she was to see me. She had no typical symptoms of tubal pregnancy. There was simply this constant and rather trivial hemorrhage which on the day she came to me contained some shreds. She had had no pain or syncope. Vaginal examination revealed a small tender mass close to the right side of the uterus, and the fact she had been married a year and a half, had never become pregnant, and yet wanted a child, led me to suspect tubal pregnancy. I operated the next day and found it. There were no symptoms of concealed hemorrhage, yet there was a quantity of free blood in the peritoneal cavity, beginning tubal abortion.

DR. JAMES F. BALDWIN, Columbus, Ohio.—At the meeting of the American Medical Association held in Atlanta, Georgia, some eighteen or twenty years ago, during a discussion in the Obstetrical section, I reported five cases of ectopic pregnancy in which I had made the diagnosis and operated before rupture. That was just after the publication of Tait's book, in which he positively and repeatedly had made the assertion that diagnosis before rupture was impossible. At that same meeting Dr. Joseph Price, if I remember correctly, reported one case in which he had made the diagnosis before rupture, but rupture took place that night and he operated the next morning. My statements at that time were evidently accepted with some doubt, since one gentleman who was present wrote to the late Dr. Coleman, President of the Ohio State Board of Examiners, to find out from him whether my statements could be taken at their face value.

At the meeting of this Association held in Louisville, some fifteen years ago, I reported additional cases, my paper being based on eleven cases in which I had made the diagnosis and had operated before rupture. At that time I am happy to say that several gentlemen present reported one or two cases in which they had done the same thing, so that it was evident that my original report was doing some good. At the present time it is not at all unusual to hear reports of cases in which the correct diagnosis has been made before rupture and operation undertaken at once, but I think that I am the pioneer in this matter.

Why is it that general practitioners and surgeons—at least those who call themselves surgeons—are overlooking these cases so constantly? I had not been able to answer this question until recently, when I noticed an aphorism by Wundt which, I think, explains the matter fully. He says: "Men think very little—and very seldom." Of course they think they think, but in that they are clearly mistaken. Just an illustration: Years ago medical students were taught to give a purgative in cases of suspected appendicitis. The pathology of the day indicated that a quick acting purgative would unload the bowel, relieve the congestion, and cure the disease. At the present day all surgeons know that this is the worst possible practice, since the purgative greatly increases the danger of rupture, and with the rupture the diffusion of infection widely throughout the abdomen. We have been talking this for years, and yet how slowly has our advice been accepted. The general practitioners, at least large numbers of them, are still giving these patients calomel and salts, and when the surgeon is called the case, if not hopeless, is in much worse shape than it would have been without the purgative.

Papers like the one before us should be widely published and republished, and not limited to the AMERICAN JOURNAL OF OBSTETRICS, or to our volume of Transactions. Such publications do not reach the general practitioner. Physicians must be instructed, as the Bible says: "line upon line, precept upon precept, here a little, and there a little"; but ultimately the profession will learn to recognize these cases. But the embryo surgeon needs this information as much as the general practitioner. This has been impressed upon me over and over again. I was called not long ago to a hospital in a thriving town of 25,000 inhabitants, to see a woman who had been in the little local hospital for a week. The case was absolutely a typical one of ectopic pregnancy with rupture and infection. The case had been studied by the "staff" but no diagnosis had been reached, and they were very much surprised at the diagnosis which I made, which was verified promptly by operation, with prompt recovery. Again, a few weeks ago, a woman came into my office who had been seen by the "surgeon" connected with a hospital in a similar thriving town. He told her that he thought she was threatened with a miscarriage and made no examination. The diagnosis of an ectopic pregnancy was easily made and promptly verified by operation. In my own city a woman was under the constant attention of two well-known surgeons for two weeks; the history was typical, the local conditions typical, but yet no diagnosis was made. They evidently had not really done any thinking in that case. The general practitioner, therefore, is not the only one that is at fault. The surgeons must remove the beams from their own eyes before they seek to cast out the motes from the eyes of the general practitioner. We need more papers of the kind just read, and such papers should be read at meetings of general practitioners.

DR. CHANNING W. BARRETT, Chicago.—We have heard of the typical and atypical cases of ectopic pregnancy. I would be more inclined to say that there is a typical severe line of symptoms and a typical mild line of symptoms, and why we should speak of fifteen per cent. that have a severe line of symptoms as typical and the eighty-five per cent. that have a mild line of symptoms as atypical, I do not know. We have a perfectly typical picture of extrauterine pregnancy in patients who do not fall, become unconscious, and do not lose their lives. Cases presenting a mild line of symptoms, if carefully studied, are perfectly typical of extrauterine pregnancy the same as those who have a severe line of symptoms, but we never know when a patient who has had the typical mild line of symptoms will present a severe line of symptoms. Further we have no way of absolutely knowing that a patient who has a severe condition has stopped bleeding, or when it will return. Some say that operation is like amputating a leg when a patient is in profound shock from a railroad injury. We would not operate during such a shock. We have a way of knowing that hemorrhage has stopped in that case of injury to the leg, and we can wait for the shock to subside. But in the case of bleeding in the abdomen, we never know when the hemorrhage has absolutely stopped, and we may lose our patient by waiting for her to recuperate. I have not seen them die from operation in the severest of conditions. Generally they go on to recovery. I have had personal knowledge of mortality without operation.

Dr. McClellan (closing).—Just a word to further emphasize the importance of using every opportunity to teach the general practitioner how to diagnose these cases.

In Ohio we have a society of clinical surgery, and have learned to value its importance to the general practitioner. While this class of cases cannot often be demonstrated at a public clinic, yet it is possible to give many general practitioners an opportunity to visit our private clinics, and thereby fix in their minds the clinical picture as demonstrated by the pathology seen on the operating table.

Dr. Baldwin has well said the general practitioner must acquire his knowledge of ectopic pregnancy "line upon line, precept upon precept, here a little and there a little." So that we do him a distinct favor by our effort to give him opportunity to see these cases as treated by surgical intervention.

OPERATIONS AT THE HOME, WHEN AND UNDER WHAT CIRCUMSTANCES ARE THEY JUSTIFIABLE.*

BY

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The magnificent attainments of surgery during the past two decades, and the consequent saving of human life and suffering, have resulted largely from the proper appreciation by the physician, surgeon, and the people at large, of the great advantages to be secured, when operative procedures are carried out and surgical cases are treated in a well-conducted hospital. The advantages of such environment and care are so well understood by both surgeon and the laity as to require no argument upon my part, and the only qualification one would consider, in discussing the question, is as to the char-

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* Read before the American Association of Obstetricians and Gynecologists at Buffalo, Sept. 15–17, 1914.

acter and genuine worth of the particular hospital. For, as one author (Langdale) has properly stated, "The Lord only knows some of the results obtained in places masquerading under the name of hospitals." Yet, in due course of time, such institutions will settle to their proper level, and the increasing education of the people along surgical lines will demand proper attainment upon their part, or else relegation to the hospital scrap heap. Hence, they should constitute no argument against the fact that with certain exceptions —of which this paper has to deal—the hospital is the place where surgical cases can be studied, operated upon and treated along such methodical and proper lines as will, in the end, produce the least amount of mortality and morbidity. This fact has become so well understood by all classes of people that no longer is it difficult to get consent to have surgical cases transferred to hospitals, and as a result hospitals have increased in number and size until now not only our large and small cities throughout this great country, but many of the progressive country villages, are supplied with excellent little institutions for the care of the sick, both medical and surgical, occurring in their vicinity. Thus the proper development of the hospital idea and the known advantages of such institutions have gradually lessened the necessity for the home care of the surgical case, and the operation at the home should now be considered *only* when it has to its credit certain positive advantages which tend to lessen the danger to the life or future health of the patient, and which advantages outweigh the gain to be obtained by treatment in a hospital. In thus limiting the field of home surgery, I am deeply conscious of the great pioneer work done in all classes of homes by such men as Sims, Price, Wyeth, and thousands of others who have followed their example, and accomplished great good to humanity, by proper surgical service in the home, and at a self-sacrifice which is known only to those who have done the work under similar conditions.

The medical literature of the latter half of the nineteenth century teems with articles referable to the home care of surgical cases, and much has been written during the past several years in relation to urgent surgery, such as accident, railway, army and navy surgery, and various acute surgical conditions; likewise, much has been said both in text-book and various papers upon the technic, preparation of home, and the after-care, including nursing of such cases. Yet, during the past five years or more, nothing has been written in English—or translated into English—under a heading that suggests the justification for operation at the home when hospital facilities are obtainable, and are either reasonably near or accessible by train, or that newer method of transportation, the automobile.

Yet, after making due allowance for greatly increased hospital facilities throughout the country, for improving conditions of highways over which patients are transported, and for increased rapidity of transportation, we must be mindful of the fact that even in our most populated counties there are many people living from twenty to thirty miles distant from any hospital, and that among them, as well as those living nearer by, severe acute calamities arise which must be rapidly met and in a manner calculated to produce the lowest possible mortality. A modest number of such conditions are of such a nature as to be influenced adversely by transportation, even though done, as it seldom is, in the best possible manner, and in such cases it is my judgment that instead of the patient coming to the surgeon, the surgeon should go to the patient, operate at the home, and give the patient the greatest chance to conserve his normal resistance to disease. To do this involves great self-sacrifice upon the part of the operator, as well as a vastly increased amount of work. It means having a definite equipment and technic, and the taking along of one skilled assistant, who may be either a physician or a trained nurse—a physician for anesthetist and an extra well-trained nurse to leave with the patient. During the after-care the surgeon must always stand ready to respond to call, for many a fine life-saving operation has been ruined by lack of attention upon the part of the surgeon to the details of the after-care. With this brief allusion to the preparation, technic and after-care, I will leave that subject, expressing at this time my appreciation of the worth of that able article: "*Operations in imperative surgery in private houses; A demonstration of surgical technic*," read before this Association by our late distinguished fellow, Dr. Willis G. MacDonald, and printed in our transactions of 1903. That article is as good to-day as it was ten years ago, and represents the best that can be said.

Now, let us turn to the type of disease or injury requiring operation at the home, eliminating such urgent surgery as that of railway, mine, army and navy accidents, and apply our thoughts particularly to abdominal, pelvic and obstetric conditions as seen by the members of this Association, and in the foreground stands out prominently the acute perforative conditions of the hollow viscera below the diaphragm. Shall they be transported variable distances for the known advantages of a hospital or be operated upon in the home? Much can be said upon both sides, but in my judgment they are distinctly a type where the home operation has a great field of usefulness. For example, I will cite the following cases:

F. L., aged twenty-nine. Florist. Widower. Usual symptoms of duodenal ulcer for past four years. Taken with typical symptoms of perforation at 3 P. M., May 14, 1914. Diagnosis of perforated doudenal ulcer, by the attending physician, Dr. Jacobus of Millbrook, N. Y. Referred to me for operation, and in a telephone message the attending physician stated the diagnosis and deplored the fact that the patient was so situated that a home operation was not to be considered. There was an automobile ride of eighteen miles to the hospital. The patient's great pain and severe thirst led him to drink a liter of beer at a wayside inn *en route*. Reasonably rough road. Operation at hospital nine hours after perforation. Abdomen and pelvic cavity filled with gastric and intestinal contents —bile, beer, etc. Immediate suture of ulcer, drainage, etc. Rallied well and for several days seemed to be doing nicely. Died from peritonitis and toxemia eleven days later.

Is it not reasonable to presume that the great contamination in this case, with resulting death, was largely due to the spilling out of the intestinal contents, through the perforation, occasioned by the jolting incident to the transportation eighteen miles by automobile? Would not his chances have been better had it been possible for the surgeon to have gone to the patient and a home operation done?

In comparison with the above case is the one of

Mr. B., aged forty, who, while driving at a fast pace over a rough road in the spring of the year, was, by reason of wheels going into a hole in the road, thrown violently upon the dashboard, striking upon his abdomen. Suffered intense pain and shock. Removed to a nearby house, placed upon a sofa, without being undressed, and allowed to remain in that position without moving, and with legs flexed for thirty hours. His stubborn disposition had much to do with this seeming lack of attention, as he would not permit the neighborly family, in whose house he was, or the attending physician, to change or move him. Seen thirty hours after accident. Diagnosis of probable perforation of bowel. Immediate operation at the house disclosed a large rent in transverse colon, near hepatic flexure, almost severing bowel in two. Very moderate soiling of abdominal cavity, and that limited to the immediate region of the injury. Suture of bowel, proper drainage, uneventful recovery.

In this case the fortunate result was no doubt attributable to the freedom from dissemination of intestinal contents by reason of the absolute quiet of patient following the traumatism, and the home operation which entailed no possibility of increasing contamination by journey to hospital. When we consider how in these severe abdominal calamities nature splints and protects the damaged viscera by tense abdominal muscles, lessened peristalsis, flexed thighs, and increasing pain upon any attempt at movement, we should respect these natural methods of avoiding spread of infective materials and endeavor to imitate them to the greatest possible extent, carrying out our surgical procedures with the least amount of transportation and movement consistent with proper treatment. Patients debilitated by weeks of illness with typhoid fever and its resultant damage to resistance, should have their vital forces conserved when perforation occurs, and operation performed where the patient is, rather than subject them to transportation with its consequent exhaustion and necessary spread of infective materials. Stab and gunshot wounds represent the dangers of shock, hemorrhage, and spreading infection, and in my judgment—although my experience has not been great along such lines of surgery—are best treated where the accident occurs, providing the environment is at all compatible with a reasonable degree of safety and after-care.

The danger to life in certain cases where hemorrhage has to be reckoned with will constitute in many cases an imperative necessity for home operation; for instance, consider the cases of ruptured solid viscera, such as liver, spleen and kidney, and the almost certain increase of hemorrhage entailed by transportation. I have in mind one case of fracture of the kidney, treated by another surgeon, without operation, and doing nicely, when active and fatal hemorrhage intervened as a result of moving him one mile across the city to obtain the advantages of hospital care. Such calamities leave their imprint upon the mind of any surgeon who has for his aim and attainment in life the saving of the greatest number of people.

Let us consider for a moment cases of ruptured ectopic gestation, and I think you will agree with me that in the more severe type, where death from hemorrhage seems imminent, the operation should be performed where the patient is located, regardless of the surroundings. But in those cases where the bleeding has ceased, as a result of clot formation, and improvement is shown, it is evident that they will represent the debatable group, as to whether home operation or removal to a hospital shall prevail, and I cannot agree with those of our profession who would relegate all such cases to the hospital, but would take the position of Huggins (Transactions of American Association of Obstetricians and Gynecologists, 1909, vol. xxii), who says: "If the surroundings prohibit operation at the home of the patient, she should be removed to a hospital, with the *greatest possible care* in the transportation." And again, in the same article, he says:

"This operation *can be safely* performed at the home if the surroundings are not prohibitive."

As suggestive of the peril attached to the moving of such cases, let me report the case of

Mrs. T. B., aged thirty-five, referred by Dr. Nelson Borst. Usual symptoms of ectopic gestation, with rupture which had occurred two weeks prior to my entrance in the case. Patient in good condition, fully recovered from all immediate effects of the hemorrhage, pelvic cavity filled with old blood clot. No sepsis. Home suitable for operative procedure, but not considered. Patient removed by ambulance a distance of seven (7) city blocks. Reestablishment of severe acute hemorrhage. Abdomen opened immediately and the bleeding controlled, but too late to save the patient. This represents a case where life was sacrificed by substituting the hospital for the home as the place for operation.

And how frequently, when operating at the home upon one of these cases, and noting the small margin of safety in the protecting and life-saving clot, do we tremble at the thought of what might have happened had there, through any jolt or jar, been a dislodgement of that protecting plug.

Likewise, in cases of placenta previa where hemorrhage is present, we have a type of case where absolute quiet is obligatory until the proper surgical or obstetrical procedures are established and the patient placed upon a safe basis. Perhaps, a properly applied tamponade may be adequate to render transportation permissible, but I venture to suggest that a strong element of safety is produced when the procedures incident to delivery are conducted in an aseptic and painstaking manner at home.

When Cesarean section is to be performed we should judge carefully each case and be guided by the condition of the patient and the proximity of the hospital. Elective cases should, without any question, be removed, but many of the emergency type, and especially if far distant from an institution, had better be cared for where they are. In the acute infections of abdominal and pelvic organs we have not only to conserve to our greatest extent the natural resistance of the patient, but we must protect from harm those limiting adhesions which constitute in many cases the only safeguard against a general infection and be very careful how we transport those cases over city street or country road to a hospital, often to find that the localized process which nature had cared for so well while the patient was quiet at home, has been changed to a spreading infection occasioned by damage incident to removal. Likewise with that borderline class of cases, such as unruptured appendices and tubes non-adherent but distended with pus, one can well tremble at the risk incurred when rupture takes place as a result of our unwise efforts at placing them under what we consider to be a better environment. In all such cases, when removal must be practised, it should be done only under the careful guidance of a physician or nurse who is duly impressed with the seriousness of the task, and the measures of care required in the procedure. For, often indeed do we see these patients during transportation placed in the hands of irresponsible people who have no knowledge of what they are doing except that they are to land that sick person within the doors of a hospital. As a result of such treatment we can all recall cases handed over to us, exhausted, in shock or with a spreading infection from rupture and the normal resistance of the patient depleted to such an alarming extent as to place his life in great peril, thus developing upon us a responsibility and an amount of work extending over weeks or months that could have been averted by a simple operative procedure carried out at the home or judicious and careful handling of the patient during the removal. Intestinal obstruction cases and strangulated hernias, unless taken early, represent a type that should have careful judgment exercised as to where operation should be done and environment should be only one consideration and hospital *versus* home should be estimated carefully with reference to each individual case.

A moderately increased hazard is incurred in subjecting some cases of incomplete abortion with hemorrhage to removal from home, and this applies to many cases of sloughing submucous fibroids which are extruded into the vagina. Fortunately the danger incident to transportation in these cases is so well understood by the general practitioner that they are usually cared for at home or transported with care commensurate with the needs of the case.

Aged people are very loath to leave their homes and frequently when operated do not rally so well in strange and unfamiliar surroundings, deprived of their accustomed associations. Mental aberration, insomnia and increasing feebleness supervene, and the mortality will be increased by insistance upon removal in all cases to the hospital. Many such patients can be operated at home with lessened danger and added comfort. I have in mind several cases where the mental condition cleared only after return of the patient to the familiar environment of the home.

In order to prove the relative merit of hospital *versus* home operation, one must have recourse to statistics as to mortality, and in this particular subject they are difficult to obtain; and one must always consider that cases operated at home represent a severe type made up largely of the emergency type, and many of them suffering from sepsis or toxemia. Naturally, under such conditions, one could not expect to have as good mortality rate as in hospital cases where elective work and uninfected cases are the rule rather than the exception, and yet in my surgical work in the hospital covering a period of twelve years, 1902 to 1914, and with an average of 60 per cent. abdominal work, there was a mortality of 3.4 per cent. The average mortality during the past three years was 2 per cent. No attempt was made to exclude any properly operative case and all patients dying in the hospital regardless of when or what complication, were included. After a careful and exhaustive study of my results obtained when operation was done at the home, covering the same period of twelve years, I find that the mortality is 4.3 per cent. When we consider that the home-operated cases represent the severest type, and that the performing of elective surgery at the home was discouraged, I think the above statistics, covering several thousand hospital and home cases—about 20 per cent. being operated at home—speak for a fair amount of safety for the home operation.

One could go on indefinitely sorting individual cases from various types of surgical disease that would be best cared for in the home and it is quite impossible to lay down any hard and fast rule to govern us. It should suffice and the purpose of this paper will have been obtained, if I have left with this Association the thought that in these days of magnificent hospital development and attainment, there still remains a modest number of cases where the life and health of the patient are rendered more secure by operation performed at the home.

295 MILL STREET.

DISCUSSION.

DR. GORDON K. DICKINSON, Jersey City.—I am glad to hear a paper on this topic, because last year I was critcised by the president and others for a suggestion in technic I made, that might be of avail in the home operation. I am fully convinced that there are several aspects to this subject. Dr. Sadlier living in an agricultural neighborhood undoubtedly is called frequently to the country to operate and necessity must arise when he will have to attend patients in their homes. Anybody can operate in a home, anybody can operate in a barn, but the trouble comes when complications take place, and they occur altogether too frequently. For instance, a dilated stomach after the operation, or a dilated duodenum or ileum and the other conditions that arise, and you cannot in the night direct treatment as well in a home as you can in a well-organized hospital.

Then again, I perceive in this, not in Dr. Sadlier's case because

I know him too well, the cloven foot of commercialism. There is too much in trying to do things in the home and the attending physician pushes himself in and takes charge and assists in the operation too regularly and in the after-care to a certain extent in the absence of the surgeon, thereby enabling him to come in rather deeper on the fee. I want to say just now what I wanted to say a little while ago in connection with Dr. McClellan's paper, that we have two classes of surgeons, one wise with the fingers, and the other wise in brains. We have those who are skillful and wise, but they are the true geniuses of the profession. The man who is wise in his brain is the man who is well able to progress in medicine, while the man who is a mere mechanician does very little or nothing for the profession. All hospitals should not only be considered places where patients should be taken for recovery, but they should be universities for postgraduate work, and with every patient who is operated at home we miss an opportunity to educate the profession. If a town is sufficiently large to have a hospital and there are many cases of peritonitis from appendicitis, there must be a poor surgeon there because he has failed to educate the profession as to the proper time to operate for appendicitis cases. The same holds true with regard to cases of ectopic pregnancy and tubal abortion. Every patient should be considered as not only a true patient but also a subject for education.

REPORT OF A YEAR'S WORK WITH THE ABDERHALDEN REACTIONS.*

BY

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Cleveland, Ohio.

THE work of Abderhalden in establishing the serological ferment test for pregnancy is too well known to require any discussions of its principles. Since its announcement a large number of workers the world over have been busy and have published their results from time to time. The wide discrepancies in these reports have doubtless been due to a variety of causes.

Undoubtedly the apparent simplicity of the test led some unprepared workers into the field with inevitable failure as the foreordained result. Many of them have more recently published later reports showing the cause of early failures.

However, in spite of the improved technic, and greater skill of the workers as their experiences with the method has increased, widely varying reports continue to come in. In view of the fact that many differences of opinion still occur among the most competent observers,

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* Read at the Annual Meeting of the American Association of Obstetricians and Gynecologists, Buffalo, September, 1914.

with regard to various phases of the test, it is apparent that much work remains to be done before the reaction is removed from the academic to the clinical field.

There is one incontestable, underlying fact about the Abderhalden reaction, viz., that by it in pregnacy cases, we may demonstrate the presence in the blood of a ferment or ferments which, at body temperature, are capable of breaking down the proteid molecule of placental tissue into smaller particles dialyzable through a membrane, which will not permit the passage of the unbroken molecule.

By means of this reaction it has been conclusively shown that such a ferment is, with rare exceptions, constantly present in the blood serum of normal pregnancy. The problems which still confront the workers along this line are numerous, but some of the principal ones may be stated as follows:

(1) *The Test.*—Can some simpler method be devised for demonstrating the presence of the ferments? The optic method with the polariscope seems to be too difficult for general use.

Abderhalden and Fodor have announced a third method by determination of the nitrogen in the dialysate and are working on a staining method.

Engellhorn and Wuintz have announced a placentin skin reaction, similar to the tuberculin and luetin skin inoculation tests. They used a placenta extract for the test, and report good results, but have refrained from giving out their method of preparing placentin. If their report is confirmed it is important. P. F. Williams has been trying out a coagulation and filtration method. Simpler methods should be constantly sought for.

(2) *Normal Pregnancy.*—Does it ever happen that during the course of a normal pregnancy the ferments are temporarily in abeyance or absent, or are negative results due to faulty technic? Only larger statistics can answer conclusively. Whenever possible, a negative test in pregnancy should be immediately repeated to answer this question. More reports are needed in very early pregnancy and in postpartum cases to determine how early and how late the reaction is present.

(3) *Pathological Pregnancy.*—Are the pathological conditions of pregnancy, particularly pernicious nausea and vomiting, and eclampsia associated with any changes in the activity of these ferments? The early suggestion that these conditions were due to inactivity of the protective ferment, seems to be contradicted by the fact that nearly all of the workers find the reaction present. Some emphasize that the reaction was very strong in eclampsia.

Does syphilis or the administration of antisyphilitic remedies, such as salvarsan or neosalvarsan, affect the activities of the ferment? Petri found the reaction present in luetics who had received active treatment.

(4) Is the reaction specific, *i.e.*, is the ferment present in pregnant blood serum capable of digesting placental albumin only, or will it digest other albumens, *e.g.*, cancer, sarcoma, normal uterus, etc.? Will the ferment present in the blood serum of malignancy cases digest its corresponding albumen invariably? Will it also digest placental albumen?

(5) Is the reaction tissue system specific, interaction occurring among a particular set of organs, *e.g.*, generative, digestive? If dependent upon the tissues involved, does this specificity relate to organ function, or to embryological origin of these tissues?

Positive statements widely at variance with regard to specificity, all by competent men, remain as yet unexplained. Apparently only visiting each others laboratories for personal observation of methods can clear up some of these differences.

(6) To what extent, if at all, is the reaction brought about by inflammatory process in the body? Upon the successful working out of answers to these problems, depends the future use of the ferment test clinically.

The data given below comprises a year's work, a partial report of which was made last spring before the Cleveland Academy of Medicine.

Main points in present technic:

(1) Absolutely fresh placenta; complete freeing of the tissue from blood by repeated washing in water and finally in physiological salt solution; repeated boiling.

(2) Careful testing of the prepared material for reaction to ninhydrin.

(3) Preservation in small pieces in equal parts of water and chloroform overlaid with toluol.

(4) Retesting of the material each time before using.

(5) Securing the blood in dry sterile test tubes. Blood is allowed to stand for separation of serum. It is not centrifuged.

(6) Serum obtained by pipettes cleaned with water, alcohol and ether.

(7) Use of only fresh serum for the test.

(8) 1.5 c.c. of serum on placental albumen within the capsule.

(9) 20 c.c. of water for the dialysate. Both serum and dialysate overlaid with toluol.

(10) Incubate at 37°C. for eighteen hours.

(11) 5 c.c of dialysate tested by 2 c.c. of 1 per cent. ninhydrin, boiling one minute and allowed to stand thirty minutes.

(12) The serum for the control tube must be from the same patient, as the tested blood; inactivated at 56 centigrade for one-half hour.

(13) Even the faintest pink or purple color is read as positive. Straw color or no change is negative.

(14) The control must be absolutely negative or the test is regarded as faulty.

(15) Commercial peptones proving unsatisfactory for testing capsules, we are now testing them by running parallel series both Nos. 1 and 2 tubes with known good capsules.

(16) Capsules cleaned by prolonged washing, and boiling for one to two minutes. The No. 579 A Schleicher and Schüll capsules are used.

We have naturally at different times been subject to the various errors both known and unknown which make this work so difficult. The best safeguard against technical errors leading to false conclusions is in careful control not only by the inactivated serum, but by running several bloods at once. We ran three to eight bloods with their respective controls in most of our tests. The value of this is illustrated by some of our failures. Six known pregnant bloods were run on contaminated placental albumen—five positives in both tubes, and one negative in both tubes showed conclusively the faulty technic. On another occasion five bloods were run and incubator trouble caused complete failure of the test.

We secured nine pregnant bloods at another time. Six were immediately run through, all being positive with negative controls. Three were placed in an ice box at a temperature of 5 to 6 centigrade. After twenty-four hours these were taken from the ice-box and run through. All of them were negative. These were not included in our tabulation because not fulfilling one of the prime requisites of the test, viz., fresh blood. It is possible that the low temperature destroyed the activity of the ferment. Eight times we were obliged to throw out individual tests because of positive controls, due probably to old bloods, unclean glassware, failure to overlay with toluol, etc.

Altogether we had twenty-two cases during the year in which demonstrated errors caused the results to be unreliable. One case in which a negative report in a pregnant patient was relied upon, in connection with the history, led to a serious clinical error.

The suggestion of Schwarz to run two capsules of the blood under examination in addition to the controls, is a good one, and will diminish the chances of error due to a faulty capsule. In addition every test upon which clinical action depends should be run with several known pregnancies. As a further control, an unexpected negative, or a negative in a diagnostic case, should be confirmed by immediate testing of the capsule. A second blood should be then secured from the patient and the test repeated.

	Positive	Negative	Total
Known pregnancy serum on placental albumen....	117	4	121
Postpartum to three weeks placental albumen....	9	1	10
Known pregnancy serum on cancer albumen.....	5	2	7
Nonpregnant serum on placental albumen.......	27	74	101
Cancer serum placental albumen...............	9	2	11
Cancer serum on cancer albumen...............	8	2	10
Sarcoma serum on cancer albumen............	1		1
	176	85	261

Of the eleven cancer cases, eight were positive to both placental and cancer albumen. Two were negative to both. One was not tested to cancer albumen. Among nine eclamptics and severe preeclamptic cases, eight gave positive reactions of usual intensity. One was negative. Syphilitics both before and after salvarsan showed the usual reactions. Of sixteen sexual perverts from the Cleveland State Hospital, all nonpregnant, eight were positive and eight negative. Of the positive nonpregnants, nine were cancer, three fibroids, one pseudocyst, four inflammatory conditions, eight sexual perverts, two unexplained. Total twenty-seven.

The reaction in our small series of sexual pervert cases suggest further investigation along this line. May it have to do with tissue system reactions? In future cancer case we will endeavor to specify the location of the growth and the source of the cancer albumen.

Conclusions.—(1) The Abderhalden ferment test is delicate and requires great care and considerable experience for successful work. (2) Because of the great variety of conditions which may give the reaction, positive result cannot be taken as conclusive evidence of pregnancy. (3) The negative reaction, if repeated, and well controlled, is quite reliable as an indication that the patient is not pregnant.

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DISCUSSION.

DR. ASA B. DAVIS, New York City.—I know very little about this reaction. However, I think we ought to commend the work which Dr. Skeel has been doing and encourage him to keep on with the same. We have used this test in about 150 cases in the Lying-In Hospital in the last year and a half, but at the present time no definite conclusions can be drawn. We are not satisfied that there is very much in this reaction. It is too delicate and uncertain to be of any particular value, although of great scientific interest at the present time.

TREATMENT OF PUERPERAL THROMBOPHLEBITIS.*

BY

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WHILE the average mortality of puerperal pyemia is ordinarily regarded as between 67 per cent. and 75 per cent., it is probable that the mortality of pyemia due to infected thrombophlebitis, in which the veins of the broad ligaments, the internal iliac, or the ovarian are involved, is 100 per cent.; at least. I have not been able to find any cases of recovery without operation on record in which such a lesion was demonstrated by subsequent operation or history.

The classical symptoms of pyemia from infected thrombophlebitis are repeated chills, with corresponding wide fluctuations of temperature, with direct evidence to the touch of involvement of the veins of the broad ligaments on one or both sides. It is possible, as in the case reported by Jellett, that there may be no evidence of involvement of the broad ligament, but such a condition is a rare exception.

Treatment of these conditions by vaccines and serums is quite uniformly conceded to be futile, and expectant treatment, if the diagnosis is correct, means a mortality of 100 per cent.

In 1909, J. Whitridge Williams, of Baltimore, contributed an exhaustive article on this subject, in which he made a study of fifty-six operated cases (AMER. JOUR. OBSTET., vol. lix, No. 5). Five of these cases were his own, with one death. Excluding from the entire number of cases certain ones in which there was an error in

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diagnosis, or technic, he concludes that operative mortality, when the thrombus is limited to the ovarian veins, should not exceed 10 per cent., provided the operation is performed early; when other vessels are involved, the mortality he places at 25 per cent. The operation, he says, should be undertaken as soon as the diagnosis can be made, "which is assured whenever a worm-like mass can be palpated at the outer portion of the broad ligament in patients suffering from chills and a hectic temperature."

The transperitoneal route he greatly prefers to any form of extraperitoneal operation. His technic is ligation of the infected veins beyond the point of extension of the thrombus.

Hiram N. Vineberg (AMER. JOUR. OBSTET., July, 1913,) reports a case in which he excised not only the entire right ovarian vein up to the vena cava, but removed also the uterus. His patient recovered promptly.

In August, 1913, Jellett, Master of the Rotunda Hospital of Dublin (*Surgery, Gynecology and Obstetrics*), presented quite an exhaustive monograph on this subject, in which without hesitation he earnestly recommends operative treatment. He reports five cases with two deaths.

Most of the operators recommend excision of the veins following ligature, but Williams in his monograph states that this treatment is rarely necessary, but that ligation is sufficient.

In my own experience I have operated in four of these cases with one death. The details of the cases are without interest, as they present no unusual features. One followed an induced abortion, the others full-term labor. In all the characteristic symptoms were present. I report the cases because the operative technic which I adopted varied from that recommended by the surgeons who had previously reported. In all of my cases the thickened vein was readily identified, and in two of them, in addition to the ovarian, some of the branches of the internal iliac were involved. All of the patients were in desperate condition, and it seemed wise to complete the operation as rapidly as possible. Accordingly a hysterectomy was made, after sterilizing the vagina and endometrium with iodine, and the vagina left widely opened. The affected veins were then exposed by separating the peritoneum, and cut cross with free escape of rotten blood clot. Care was taken to manipulate the veins as little as possible so as to avoid pushing the clot toward the vena cava. This was especially true after my first fatality. No attempt at ligation of the veins was made, but the pelvis was filled with an iodoform gauze fluff pushed down from above into the vagina, and over this the sigmoid flexure of the colon was stitched around the pelvis so as to completely occlude the peritoneal cavity. As the patients were all young an ovary was saved in each instance. In three of the cases prompt recovery ensued. In the fourth there had evidently been a disturbance of the clot, and death occurred suddenly.

In all four cases the uteri submitted to the pathologist were found by him to contain multiple abscesses, showing that the removal had been wise. By thus detaching the uterus, with ligation merely of the arteries, the veins of the broad ligaments are left free to drain into the gauze fluff, and thus out of the vagina, so that a beginning thrombus in any one of them would most likely prove harmless. By making no effort to excise or even ligate the veins, a minimum of manipulation and traumatism results, with correspondingly diminished risk of breaking off a portion of the clot to drift into the vena cava.

As the infection reaches the veins through the sinuses in the uterine wall, it is evident that in a large proportion of cases the uterine wall itself is the seat of abscesses, as proved to be true in all my cases, and the removal of the uterus not only gets rid of a source of continued infection, but also gives absolutely free drainage of all the veins that can possibly be directly at fault. These veins are usually without valves, and with a free opening at the bottom where the infected clot is breaking down, the contents would naturally extrude in that direction, instead of extending upward, as must necessarily be the case when no direct down drainage is secured. The fatal case I here report more at length:

Mrs. E., aged twenty-six. Married eighteen months. One early miscarriage about a year before. Was delivered by her physician, April 22, 1914, with forceps, the instrument being applied with the head on the perineum, and without laceration. Thirty-six hours later she had a chill with a temperature of 105°. She had daily chills from that time until the 26th, when I saw her in consultation. Blood count, 23,000 leukocytes, 90.6 per cent. polynuclears. Vaginal examination showed some laceration of the cervix on the right side. In the left broad ligament, however, was found the typical condition showing infection at that point. Right broad ligament entirely free. Vaginal discharges odorless. I advised expectant treatment of the case for a few days, but with operation later if the conditions did not improve. April 27 the patient's condition was pretty fair all day. No chill, but continued high temperature. On the 28th and 29th no chills, but general condition not so good. Temperature 104°. Some tenderness now in the right broad ligament as well as the left, but could make out no distinct mass on that side. Operation advised.

Operation.—Median incision. The veins in both broad ligaments were found involved, the infection extending on the left side into the ovarian and also into branches of the internal iliac. A pan-hysterectomy (except the ovaries) made in the usual way, with wide drainage of both broad ligaments, the posterior vaginal wall being split for the passage of an ample gauze fluff, over which the sigmoid was attached all around to the peritoneum.

Examination of the uterus showed the entire placental area to be infected, while the inner surface of the entire cervix was sloughing. Minute abscesses in the walls of the uterus on both sides.

For forty-eight hours the patient materially improved, except that her pulse and temperature failed to subside as much as had been hoped. She reported herself as feeling fine. On the morning of May 1 she seemed a little better, and when seen about six o'clock that evening had apparently held her own nicely all day. I was called out of the city at that time, and when I returned at 10:30 P. M. found her dying, with every evidence of plugging of the pulmonary arteries. Death was attributed to a breaking loose of a pelvic clot.

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DISCUSSION.

DR. ABRAHAM J. RONGY, New York City.—Mr. President: In these cases of septic thrombosis, no time should be lost in treatment with stock or autogenous vaccines, for if they are to be operated and there is any chance at all from operative interference, it should be done early. If you should lose twenty-four to forty-eight hours with vaccines so much more is lost and the patient's chances for recovery are much more unfavorable.

DR. JOHN NORVAL BELL, Detroit.—I must confess, that I am on the conservative side of this subject. I am sorry that Dr. Huggins is not here, as he has done some operations for these conditions. It does not seem to me that you can operate, unless one is very expert, without stirring up these veins, and the danger lies in the infected clot getting off into the circulation. A man must have a great deal of surgical ability to get good results. However, I am glad the subject has been brought up, but I must frankly say that I am on the side of the conservatives in the treatment of thrombo-phlebitis.

DR. BALDWIN (closing).—I am naturally a born conservative. I was a general practitioner, and an obstetrician of pretty large experience, before I was forced into surgery. I am sometimes sorry that I did not stay in obstetrics. I think, however, the records will bear me out in the statement that when we have a condition such as I have described, and as described by the writers to whom I refer, we have a mortality under conservative treatment of exactly 100 per cent. We have all had cases of infection of the broad ligament, but without extension of this infection into the pelvic veins, and these cases under conservative treatment may get well after weeks or months, or frequently after opening through the vagina an abscess which has formed in the broad ligament. But when, on the other hand, the renal vein, or branches of the internal iliac, become involved, and are discharging their infectious contents directly into the vena cava, with repeated chills and high temperatures, these patients die. I think they always die, and if recovery takes place a mistake was probably made in the diagnosis. If, therefore, in these cases we have a mortality under conservatism of 100 per cent., something more radical should be done. According to Dr. Williams' report, which was published several years ago, he had one death out of five, and if these cases can be handled with a mortality of 20 per cent., or even a much larger per cent., there is certainly a fair percentage that we can save. I have had four cases and saved three. That is certainly worth while. But in all these cases we must be sure of the diagnosis, and for that purpose we must consider the history as well as the physical condition. Williams says that if we get a history of repeated chills, with a high rise of temperature and a rapid fall, giving an excursion perhaps of 10 degrees in a day, and if on examination you find these enlarged veins on one or both sides, the diagnosis is established, and on opening the abdomen you will find the infected veins feeling like hard cords, extending upward. If it is the ovarian vein it will stand out almost like a broomstick. It pushes itself prominently forward.

I agree with what has been said as to the danger of manipulating these parts by the inexperienced operator, since he may thus express into the vena cava a large infected clot. If, however, the uterus is pulled up and removed in the usual way, with the least possible manipulation of the infected veins, the danger is much less than if the ovarian veins are manipulated by dissection in an attempt to reach their point of entrance into the vena cava on the one side, or the renal vein on the other. It is at this upper end where we are most likely to break off the clot. A minimum of manipulation means a minimum of danger of extruding the clot.

Dr. Humiston, Cleveland.—I would like to ask Dr. Baldwin where he makes the opening in the vein and how large?

Dr. Baldwin.—If the uterus is large I bring it up, assuming it is at full term, and make a pan-hysterectomy in the usual manner, though in one of my cases I left the cervix. As the infected vein is cut across there is a little gush of necrotic clot which is, of course, carefully wiped away. The veins are left wide open, but the arteries are ligated as usual. The vein can be easily felt, indeed, it makes itself very prominent as it passes over the brim of the pelvis. The vagina is then widely opened, a fluff of iodoform gauze passed down from above and left so as to fill the true pelvis and cover over the open veins. Over this fluff is swung around the sigmoid and attached by catgut stitches so as to make a complete floor of the abdomen and roof of the pelvis. It seems to me that this procedure inflicts a minimum amount of traumatism, and gives the patient the chance for recovery to which every patient is entitled.

Dr. E. Gustav Zinke, Cincinnati.—Have you had any experince in the use of autogenous vaccines in these cases of puerperal infection where the parturient tract has been clear of the infection, but where the infection has gone beyond?

Dr. Baldwin.—We have a man right in the hospital who is skillful in making autogenous vaccines, and fortunately for some of us who are slow in the faith he is quite enthusiastic. On two occasions he used autogenous vaccines. If there is time for their administration, and while waiting to determine positively the diagnosis before resorting to operation, their administration is justifiable, but I deem it inadvisable to delay surgical interference while merely awaiting possible benefit from such vaccines or any of the serums.

PREGNANCY AND INCIPIENT AND INACTIVE TUBERCULOSIS.*

BY

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It is estimated that there are at least 32,000 women in the U. S. suffering with active tuberculosis, but as to the number of incipient and inactive or healed cases, one could scarcely venture a guess. Until there is more uniformity in the diagnosis and classification of these cases, accurate data are impossible. Statistics of one sanatorium showed 25 per cent. of its cases to be incipient, and even though the same percentage obtained in all, we know that but a small number of tubercular cases go to sanatoria.

Bacon states that 1 to 1.5 per cent. of all women becoming pregnant have tuberculosis of the lungs, such as to be diagnosed if careful examination is made, and Freund found, in a series of 1000 pregnancies, there were twelve cases of tuberculosis; six of which were in a serious condition.

It is reasonable to conclude that of the cases of tuberculosis becoming active within a few months after delivery, the majority were undoubtedly incipient before or early in pregnancy. Lobenstine, before this Society, in 1912, cited the following to prove that pregnancy and labor are responsible "for the development of tuberculosis in susceptible individuals and may cause a dormant tuberculosis to rekindle. Fishberg states that 37.4 per cent. of his tubercular cases dated their first symptoms from childbirth; Maragliano, 59 per cent.; and Trembley, 63 per cent. whose ill health after childbirth ended in tuberculosis."

In the course of ten years experience as examiner for several in-

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surance companies the large number of cases of tuberculosis in the family history dating their illness from childbirth has attracted my attention. In view of all these observations, we must conclude that pregnancy is an etiological factor to be considered in tuberculosis.

Few medical men will be found to-day who hold to the old view, still held by many of the laity, that pregnancy benefits a tubercular case. We now believe with DeLee "that pregnancy tests the integrity of every organ in the body, and if any of them is diseased, the fact will usually be brought out."

That improvement is occasionally seen even in an active case of tuberculosis during pregnancy, will be admitted by all, but it is the exceptional case that does not go down more rapidly after the confinement, if the decline does not begin in the later months. Improvement is probably seen more often in an incipient or inactive case as the result of the stimulation to the general nutrition, the better hygiene and the less active life, but when the apparently protective influence seen in pregnancy is removed and the strain of labor and drain of lactation have lowered the vitality and lessened the resistance, the latent or inactive process becomes active and the disease often progresses rapidly. One writer estimates that fully 75 per cent. of slightly active tubercular cases are aggravated by pregnancy and labor and, as stated before, statistics do not separate the incipient and mildly active cases.

What should we consider an incipient case? Where, to the patient's knowledge, she has not felt badly more than four or five months, has lost a few pounds in weight, runs a temperature up to 99 1/2° in the afternoon, has a slight catarrhal condition in one lobe or one apex with evidence of slight infiltration, very limited in extent, such a case should be considered an incipient tuberculosis. A diagnosis cannot often be made save after repeated, careful examination of the chest and close clinical observation.

That the average man in general practice does not diagnosticate tuberculosis in the incipient stage is certain. Not infrequently the ablest internists overlook them and, doubtless, obstetricians and gynecologists do the same. Lobenstine found in his cases, that while some of the mild ones stood the strain of pregnancy with but little apparent damage, in from 35 to 60 per cent. the tubercular condition was aggravated, and it is fair to conclude that incipient cases would fare no better. The early months, with their nausea and vomiting, often interfere with the general nutrition and even though the patient puts on flesh and gains strength during the middle period, it may give way to impaired health during the last two months when the lung is embarrassed by the pressure from below or, if the patient goes through labor in good condition, the period of lactation all too often brings on renewed activity.

The management of an active tuberculosis complicated by pregnancy presents its problem, but probably a less difficult one than the incipient and inactive cases; the problem is greater than in the active case because we have every reason to hope and expect that under favorable conditions, these incipient cases will get well, that is, clinically well.

What then should be the attitude of the obstetrician or physician toward the incipient tubercular case? In the first place, such a patient should be advised not to marry until well, or, if married, she should be warned of the deleterious effects of pregnancy in the large majority of cases. In all who are married or marry against our advice, which most of them do, we of course advise abstinence, though we do it knowing that it will not be practiced, and we realize that preventive measures are usually failures in the end. There is nothing so disheartening to the physician who has been watching an incipient case, noting its gradual improvement, as to have a pregnancy set in to complicate the situation.

In every such case we should first ask for a consultation with a competent internist and if tuberculosis can be demonstrated clincially to the satisfaction of both men, a therapeutic abortion should be advised and urged. Therapeutic abortion is justified in incipient tuberculosis on the assumption that the patient, if allowed to continue in her pregnancy will suffer serious injury and that an abortion will avert this danger. If performed, it should be done as soon as a definite diagnosis of pregnancy is made and this should be possible in primiparæ before the twelfth week. Rapid dilatation and curettage under anesthesia is sufficient, following which the patient should continue under the most approved tonic and hygienic treatment.

The mortality and percentage of relapses, according to Trembley, who has had a wide experience in these cases, is *nil* when the abortion is induced before the end of the third month.

It is difficult to convince the average woman of the dangers of an incipient tuberculosis, for the most intelligent are all too often prone to regard it all too lightly, and even though she may not object to an abortion, few would be willing to submit to temporary sterilization, however advisable it might be. For such as will submit to this, various procedures have been brought forward, but the most certain probably, is the bringing of the uterine end of the tube under the peritoneum or within the broad ligament. If the patient recovers from her lung infection, by a subsequent operation the ends of the tube are reunited. In view of the fact that pregnancy may not occur, the operator should be safeguarded by a written agreement signed by the parties concerned.

If the incipient case is a problem, the healed one is even more of one. There are two classes of these cases; first the early cases in which the patients are apparently cured, where the process is arrested and second, those in which the disease was fairly well advanced but has been inactive for two or more years—the early and the late healed cases. By a healed case, we mean, one in which the patient has no fever, is up to normal or above average weight, with good nutrition, and good endurance. There may be areas in the chest showing more or less involvement, areas giving physical signs, such as dullness and vocal fremitus, or in the late cases even râles; but, aside from this, the patient is normal.

In every healed case the *x*-ray is a valuable aid in determining the extent of the previous involvement and should be invoked whenever possible. In early cases, pronounced cured or arrested by a competent observer, how long an interval should elapse before pregnancy is allowed? Heretofore, a year's freedom from symptoms has been deemed sufficient; but internists and tuberculosis specialists now feel that this is too short a period, and the time should be lengthened to at least two years.

Von Bardeleben maintains that old healed nonactive tubercular processes do not furnish an indication for abortion, but advises that the condition be most carefully watched on account of the possibility of reactivation. While Trembley states that cases, apparently cured, having remained without symptoms for at least a year, may be allowed to go to term under most careful supervision, he has found that nearly every quiescent or arrested tubercular case, when becoming pregnant, had a serious renewal of activity and resulted in the dissemination of the disease throughout the pulmonary system and even attacking other parts of the body. DeLee says, "if a dormant tuberculosis awakens in pregnancy or a new infection occurs, the course of the disease is apt to be more rapid, being usually of the more florid type."

In any healed case, when pregnancy ensues, the patient must be kept under careful observation, if possible in a suitable climate; she must be well fed with good nutritious food, and avoid exhaustion and fatigue; every thing should be done to conserve her strength. If there is much nausea and vomiting, the danger of weakening her resistance is increased. The temperature and pulse should be watched, the weight taken frequently, and exercise and sleep regulated. This care should be redoubled during labor, shortening its duration by the timely use of forceps in the second stage, and using every precaution to avoid infection and hemorrhage. At the best, the mother's strength has been sorely tested by the pregnancy and labor and lactation cannot but add to the drain, so it must be the exceptional case that is allowed to nurse the infant at all.

If a healed case is *reactivated* by the pregnancy in the early months as a result of the vomiting and consequent loss of strength and resistance, an abortion may be advisable; but we must realize that the tubercular process may not again be arrested by this procedure and that unless the original infection was very slight, the disease is not apt to be shortened. In all such cases we must really individualize. A woman going through pregnancy is going through the hardest kind of work and we must decide whether she is able to stand such work before we consent to her becoming pregnant. Many healed cases go to full term safely, but there are no statistics available that are convincing. The physician must necessarily be somewhat of an alarmist in all these cases; the circumstances and environment of the patient all have to be considered in advising these cases with respect to pregnancy or if pregnant as to its interruption.

In addition to those cases of active tuberculosis dating from pregnancy, of which statistics were cited early in the paper, there is a class of mildly-active or reactivated cases following pregnancy that do not go to lung specialists first, but to the family physician, or gynecologist. As young women they may or may not have been rugged, usually not, but after marriage they have become pregnant and given birth to one or more children which they have nursed varying lengths of time. During pregnancy they put on flesh and feel well, in fact look better and feel better than ever before; they go through labor and the early puerperium without complications, but following the weaning of the child, or in the later months of lactation, they have run down, lost flesh and strength, look badly and feel worse than before pregnancy. They may have some symptoms referable indefinitely to the pelvis, and if they consult the one who delivered them or a gynecologist, he is apt to think their poor health entirely dependent on a slight laceration of the cervix or relaxation of the pelvic floor. If operated, some of the local symptoms may improve, but the general health remains the same, there is no improvement.

In every gynecological case, a complete and thorough examination should be made in order to discover, if possible, all the factors having a bearing on the case. If such a case is so examined, we find the patient running a little temperature, possibly not over 99.5°, or it may be subnormal in the morning; there are no definite lung-symptoms save vague chest discomforts and little or no cough. But the patient is much under weight, has poor appetite, sleeps poorly, and has no endurance. Examination of the chest shows evidences of an incipient tuberculosis, a changed breath sound, a very slight dullness over one apex or small area of lung, with a few râles and slightly increased vocal fremitus.

The radiograph will often show the condition better than the physical examination save to an expert. Instead of an incipient tuberculosis, we find areas of calcification, and elsewhere areas of slight infiltration, or perchance an area of calcification surrounded by an area of new infiltration, which is, presumably, the healed lesion after one pregnancy with the active lesion of the succeeding pregnancy.

If the patient has had more than one pregnancy, we find each convalescence more protracted than the previous one. Nature endeavors to render the lesion inactive by a process of calcification, but in all probability bacilli still lurk within the lesion, ready to light up a renewed process so soon as the resistance is below normal.

Finally nature rebels at the repeated burden thrown on her and, if after the third or fourth pregnancy, the patient does not have a very active process started up, terminating fatally in a short time, she enters on a long period of ill-health with a slow fibroid type of tuberculosis.

Such cases must have been met by nearly every one here, and they emphasize the importance of most careful examination of the chest of each and every case coming under our care as obstetricians or gynecologists. When the condition is once recognized, future pregnancies must of course be interdicted.

If there are pelvic conditions giving rise to real symptoms such operations as may be necessary should be done, but the patient should be given to understand that the real cause of most of her ill health is in her chest, and not in her pelvis. Since future pregnancies ought not occur, the question arises: Should these patients be sterilized?

In progressive tuberculosis Bacon and Hoehne, as well as others, have advocated operations on the tube; Bumm and Martin have advocated hysterectomy; Bardeleben, excision of the placental site per vaginam, and Gauss, x-ray sterilization. But it will be the rare cases of this type of tuberculosis that would submit to any of the more radical procedures, for the operation itself might so lessen the vitality and resistance of the patient as to light up the latent process, even if the operative mortality were nil.

240 Michigan Street.

DISCUSSION.

Dr. Ross McPherson, New York City.—This valuable contribution of Dr. Dice is most important and timely, for the reason that it calls attention to a condition which is more neglected than almost any I know of. Dr. Dice has made the statement that the average practitioner considers the tubercular condition either of very little importance or else gives up hope of doing the woman good. That has been our experience in the Lying-In Hospital and in private practice, and the cases which the doctor has cited bear a close resemblance to those we see in practice. The paper also illustrates another point, which is, the importance of the obstetrician being something besides an obstetrician. He must examine the chests of his patients, and if he does this as a routine procedure, and occasionally does it afterward, he will become familiar with the conditions of the lungs and heart, and thus get a general viewpoint of the patient which he will not get in any other way. While a practitioner may be careful about pelvic measurements, urinary examinations, the Abderhalden test and reactions, etc., it is most essential for him to get a careful history, examine the chests of his patients and do something besides limiting his attention to the pelvis.

We have just had an illustration of the great value and importance of having an *x*-ray plate made, particularly where there is any doubt about the chest conditions and by so doing you will many times be able to detect lesions that you could not possibly make out with absolute accuracy by the use of the ordinary methods of examination.

In regard to the treatment of tuberculosis, it is mainly rest, and as Dr. Dice has so aptly said, when a woman is pregnant every organ in the body has to work over time. When we make a diagnosis of incipient tuberculosis that is active, the uterus should be emptied and where the woman will not consent to have this done, or where the husband will not consent to it, one should explain to the family that they must expect a fatal issue on part of the mother before long. These women go down hill rapidly in the last months of pregnancy, and one of the cases reported is a beautiful illustration of the bad practice of letting the condition go on if it can be avoided. I believe that in every case of incipient tuberculosis accompanying pregnancy that the pregnancy should be interrupted, and that there is no exception to this rule.

Dr. Arthur E. Skeel, Cleveland, Ohio.—I wish to express my appreciation of the doctor's excellent paper and its importance. Personally, I have for some time felt a great deal of doubt as to the proper management of some of these cases. It has seemed to me from the data which we have had and which we have been taught from our college days with regard to this matter, we should have somebody's statistics based on the result of modern methods of treatment of tuberculosis, and I am very glad indeed that Dr. Dice has given us this paper.

I have had two cases that made me question somewhat as to what should be done. I have one patient who, when she was two or three weeks pregnant, developed tuberculosis and consultation with an internist led him to urge that an abortion be performed. She refused. . . . She ran a temperature of 101–102°, and had apparently quite a serious condition. She refused to have abortion induced, and much to our amazement she went right along, recovered during her pregnancy from all symptoms of the condition, and a year later was all right.

I have within the past month delivered another woman whom I delivered two years ago, but who shortly after delivery developed a tuberculous condition. Possibly she was tubercular when she was pregnant. At any rate, she developed active tuberculosis after delivery, was quite sick for a number of months, was treated by a Pittsburg internist, and pronounced cured two months ago. To my consternation, she came to me five or six months pregnant again, saying she had been pronounced cured, and that she was now pregnant. I saw her a month ago. I shall watch with a great deal of interest the future progress of the case. She is apparently well.

These cases make me wish we had some reports of the results of pregnancy in tuberculosis under modern conditions of treatment and modern ideas of therapeusis.

I am very grateful to Dr. Dice for having presented this paper.

DR. GORDON K. DICKINSON, Jersey City, New Jersey.—Habit rules us all. When a woman comes to your office and you examine the urine and have taken the blood pressure, you think you have done all that is necessary. A few statistics will tell you you are wrong in that matter. Tuberculosis, according to the opinion of clinicians, in the last few years, and according to the very elaborate researches of Khon of Prague, and Mueller in Vienna, always begins in childhood. They base statements upon 2000 observations. They say it is impossible for an adult to get a massive dose of bacilli sufficient to produce tuberculosis in him. It always begins in childhood. It is stated that 90 odd per cent. of all children have tuberculosis; that one adult in six has it existing actively. Tuberculosis is never cured; it is always latent, consequently the women you are confining are tuberculous, often the woman that you are going to confine may have some active lesions in her, and if you would do your whole duty as obstetricians, you must do something more than examine the urine and take the blood pressure.

DR. JOHN NORVAL BELL, Detroit.—Regarding the treatment of pregnant women in whom pregnancy is complicated by tuberculosis, I cannot agree with the dictum of the essayist and the opinion of Dr. McPherson, that every case should be aborted. I believe a woman with incipient tuberculosis should be allowed to have her first baby, but that is all. I have seen one case with incipient tuberculosis where there was a temperature which varied from 99° to 100° and a fraction, but this patient under the treatment of a competent man who made a specialty of tuberculosis, was allowed to continue in pregnancy. The sputum test and radiographic findings were positive. We took a chance because she was anxious to have a baby, and if Dr. McPherson were a woman and wanted to have a baby, I am sure he would take the chance. She went through her pregnancy, and became perfectly well. She is to-day a well woman, and weighs 20 pounds more than she did before.

DR. WILLIAM SEAMAN BAINBRIDGE, New York City.—Dr. Dice has presented a very thoughtful and able paper, showing much painstaking effort in the correlation of the facts upon which to base his conclusions. It seems to me, however, that he has not made perfectly clear the real purport of his theme, in that he does not confine himself to pulmonary tuberculosis, as I am sure he must have intended. None of us would be willing to take the position of advising an abortion in the presence of an active tuberculous process anywhere in the body. In closing the discussion I hope Dr. Dice will clarify this particular point.

I would like to ask the essayist a few questions: (1) Has he been able, by his researches, to determine why a pregnant woman is more likely to have a preexisting tuberculosis become active? (2) Is this due to the limitation of the respiratory movements? (3) Is it the result of the general depletion of the body as a whole? If this be true, why is it that the sign of improved nutrition, the putting on of fat, is found in a great many of these cases of pregnancy? We consider a gain in weight in tuberculosis as an evidence of improvement. (4) Has there been any special study, in these cases, of the blood serum? In cancer work it has been demonstrated that the serum from a pregnant woman's blood, placed in contact with cancer tissue in the laboratory, will cause the cancer cells to grow more rapidly than when the serum from the blood of a nonpregnant woman is used. This increase in the division and subdivision of cancer cells shows stimulation more than under ordinary blood serum. This is a most interesting line for investigation. (5) In relation to the pronouncement that these women should be relieved of the intrauterine condition, has anything been done with reference to tuberculosis elsewhere than in the lungs? (6) If we are right in advising abortion in cases of tuberculosis of the lungs, how far are we justified in going in the presence of tuberculosis in other parts of the body? Recently a pregnant woman consulted me with reference to tuberculosis of the knee. Are we to have a sweeping increase in the number of therapeutic abortions for surgical tuberculosis? This seems to me to be very dangerous ground, and I feel that the Society cannot take, even by inference, any such position at this time.

DR. ROSS MCPHERSON, New York City.—Dr. Bell is arguing from one case, and if we are going to do that we can always bring up any type of case, and quote one or two which are exceptions to the rule, but I spoke from an observation of a number of cases. We have no way of determining whether the particular individual patient will do badly or well; if you wait until the woman gets through her pregnancy she may have acquired a permanent tuberculosis, and Dr. Dice has shown that the majority of them *had* acquired permanent tuberculosis when delivered. It is true some of these women will go through pregnancy perfectly, and if a woman is bound to have a baby that is her privilege. I agree with Dr. Bell in that respect.

Dr. E. Gustav Zinke, Cincinnati.—I have nothing to add to what has been already said except to refer to the dictum of Auvard: Jeune fille—pas de mariage; femme—pas d'enfents; mére—pas d'allaitement. (Young girls—must not marry; women—must have no children; if they have children—they must not nurse them.)

Dr. Dice (closing).—The point made by Dr. McPherson is well taken in regard to our advice in these cases. We advise the majority of women to have their appendices taken out if they have an acute appendicitis for we feel that is the best advice, yet many get well without operation. Twenty per cent. or more of these women with incipient tuberculosis go through pregnancy and do not get worse or go down rapidly, but we know the majority of them do, and acting on that we give the patient our advice.

With reference to the question asked by Dr. Bainbridge, I cannot say either from my reading or from investigation as to whether anything has been done along the line of serums or not, or just why it is that these patients get up a more active condition in spite of the fact they do put on flesh. We do know that many patients put on 30 or 40 pounds during pregnancy, and yet they lose it rapidly if they nurse their children. Some do not to be sure, but my observation is the large majority of them lose most of the flesh they put on if they nurse the children successfully.

Regarding surgical tuberculosis, I have not investigated that question.

There is one point I want to make, and that is to urge all obstetricians and gynecologists to examine the chests of their patients.

LABOR IN ELDERLY PRIMIPARA.*

BY

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At what time a woman may be classed as an elderly primipara is as indefinite as are most attempts at classification. With advancing years there is supposed to be an increased proportion of connective tissue in the cervix uteri, which is generally credited with being the cause of the prolongation of labor observed in some elderly primiparæ. It is doubtful if this increase of connective tissue of the

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cervix can be demonstrated, except after the menopause when the uterus takes on its senile character. If we are to judge of the amount of connective tissue in the cervix by the slowness or rapidity of dilatation and the character of the os, then age is certainly not, in my experience, a determining factor, as prolonged labor, slow dilatation of the os with tenseness of the cervix occur in young as well as in old primiparæ. If age has any effect on the uterine tissue it is demonstrated by weakening of the muscle tone with consequent inefficiency of the uterine contractions. This results in uterine inertia, the real cause of prolongation of labor, which is so commonly attributed to rigidity of the cervix.

If the average duration of labor is to be regarded as the determining factor in classification, it brings the age limit down to such an extent that a large percentage of patients in the better walks of life would have to be classed as elderly primiparæ. So, too, scattered through all ages, but increasing slightly in frequency in proportion to age, are cases of uterine inertia and prolonged labor in no way distinguishable one from another.

Consequently the dividing line must be an arbitrary boundary, placed according to the judgment of the individual observer; and, in putting it at thirty years, I follow the custom of other American obstetricians, who make the division into practically two equal fifteen-year periods. This can be conveniently subdivided into five-year periods. While some cases escape this grouping, they are so few as to be negligible. The youngest primipara I attended was just past thirteen years and had never menstruated. She was twelve and one-half hours in labor and delivered herself of a seven and one-eighth pound child without difficulty. The oldest primipara was forty-six years old and was seven and one-half hours in labor, delivering herself spontaneously of a six and three-quarters pound child. With these two exceptions all of our patients were between fifteen and forty-five years of age.

In a series of cases from the Interne Department of the Rotunda Hospital for twenty-eight months, to which I have added 200 cases from the obstetrical ward of the Western Pennsylvania Hospital, there were 4996 deliveries of which 1812 were primipara and 3184 were multipara. Of the primiparæ, 242 were over thirty and 1570 were under thirty years of age.

The average duration of labor for the older group was twenty-three and two-thirds hours, and for the younger it was twenty-one hours, a trifling difference, particularly when a reference to the statistical table shows that the duration of labor in patients from thirty-five to thirty-nine years was greater than in those over forty years of age. Of course, there were only sixteen patients over forty years, too small a number upon which to base definite conclusions, but the fact remains that if age has any effect on the length of labor, it should be manifested even in a small series of cases, other things being equal. In the individual cases the longest labor was in a primipara twenty-two years old. She was 110 hours in labor.

In spite of the comparatively small difference in the duration of labor there is a marked difference in the frequency of the need for forceps and in the occurrence of lacerations of the perineum, both of which showed increased frequency up to the age of forty, after which there is a diminution which I am inclined to believe would not persist if a larger number of cases were available for study.

In view of the fact that the duration of labor in the various groups gives little or no indication of the necessity for forceps delivery, an important point seems to be an increase in the number of perineal lacerations. This appears to indicate increased resistance of the pelvic floor, which is due mainly to rigidity of the muscles. With very few exceptions, and these equally distributed in the two groups, the os was fully dilated and the head well down in the pelvis before forceps were applied. Therefore it hardly seems likely that uterine inertia is, primarily, responsible for delay in the second stage. Inertia would presumably cause delay in all stages and it was only in the second stage that the delay was so frequently observed in these cases. This being taken in conjunction with the fact that increased frequency of forceps application is associated with increased frequency of lacerations of the perineum, it seems reasonable to infer that the lack of distensibility of the perineum causes the necessity for forceps, even though the claim is made that it is the use of forceps that increases the frequency of lacerations and not the inherent rigidity of the muscles. The course of labor indicates resistance at the outlet, labor progressing normally until the head is on the perineum frequently even visible at the vulva, and then advance ceases or is so slow that the mother or child or both begin to evidence signs of distress. To explain these cases it is not reasonable to suppose that contraction of the outlet increases with age. The other two probable factors are inertia and rigidity of the perineum, both of which enter into it, but the latter, unquestionably, is the more important.

Myomata are distinctly a complication of advancing years. Consequently, as would be expected, they are found, or at least recognized to be present, only in patients over thirty years of age. Only one of seven cases gave trouble, and it occasioned a transverse presentation, premature rupture of the membranes, prolapse of the cord and death of the child.

Eclampsia is a complication proportionately more frequent after thirty years, occurring once in every sixty cases. Before thirty it occurred once in every 177 cases. There were thirteen cases, altogether, with one death.

The occurrence of other abnormalities such as antepartum hemorrhage, postpartum hemorrhage, malpresentations, fetal abnormalities, etc., showed no particular predilection for any age period. The same is true of abnormalities of the third stage of labor, except that manual removal of the placenta was necessary three times in the older group (once for postpartum hemorrhage, and twice for adherent placenta), in the younger patients the placenta was removed manually once only, a marked difference in the percentage of occurrence.

Twins occurred with considerably greater frequency after the age of thirty, once in every forty-four labors, as compared to once in every 224 labors before thirty.

From these statistics, therefore, it appears that the only effects directly attributable to age are increase in the proportion of toxemias, increase in the frequency of twins, slight prolongation of labor, increased frequency of forceps application, greater rigidity of the perineum and, consequently, a greater proportion of lacerations, and greater frequency of adherent placenta. These three latter conditions are responsible for a higher percentage of morbidity in the puerperium. One other point which, however, I have no figures to prove, is that elderly primiparæ seem to be less successful in nursing their babies, requiring a resort to supplementary feeding more frequently than do the younger women. Increased frequency of toxemias, delay in the second stage and the two cases of accidental hemorrhage are responsible for the higher death rate among the children born of the older patients.

There were two maternal deaths in this series of cases, one from acute streptococcus infection in the Rotunda Hospital, and one from eclampsia in the West Pennsylvania Hospital, both in patients under thirty years of age.

In conclusion I wish to thank the past master, Dr. Hastings Troudy, and the present master, Dr. Henry Jellett, for permission to use the records of the Rotunda Hospital.

STATISTICS AND SUMMARY.

	Fifteen to twenty-nine years	Thirty to forty-six years
Total cases	1570	242
Abortions and miscarriages.	17	4
Average duration of labor.	21 hours	$23\frac{2}{3}$ hours
Longest labor	110 hours	$99\frac{1}{2}$ hours
Shortest labor	$3\frac{1}{2}$ hours	$2\frac{3}{4}$ hours
Average third stage	33 minutes	32 minutes
Longest third stage	3 hours (expressed)	3 hours (Man. remov.)
Shortest third stage	Immed. deliv.	Immed. deliv.
Lacerated perineum	833 or $53\frac{1}{2}$ per cent. (1 complete)	174 or 72 per cent.
Failure of primary union.	29 or $3\frac{1}{2}$ per cent.	11 or $4\frac{1}{2}$ per cent.
Episiotomy (central tear)	2	0
Forceps	116 or $7\frac{1}{2}$ per cent.	68 or 29 per cent.
Version	3	3 (2 on 2d of twins, 1 on transverse with prolapse of cord)
Cesarean section for contracted pelvis	5	0
Extraperitoneal Cesarean for contracted pelvis.	5	0
Pubiotomy	4	2
Symphysiotomy	1	0
Craniotomy	1	1
Manual remov. of placenta.	1	3 (1 P. P. H., 2 adherent)
Induction of labor	1	0
Twins	7	6
Breech presentation	40	4
Face presentation	6	0
Brow presentation	1	0
Transverse presentation	0	3 (2 second of twins)
P. O. P.	7	5
Contracted pelvis (9 cm. or less).	29	6
Prolapse of cord	2	1
Myomata (uterine)	0	7
Preeclamptic toxemia	1	1
Eclampsia	9	4
Pyelitis	0	1
Mitral stenosis (failure of compensation).	0	1
Accidental hemorrhage	0	2
Placenta previa	1	0
Postpartum hemorrhage	24	3
Hematoma of vulva	2	0

STATISTICS AND SUMMARY.—(*Continued.*)

	Fifteen to twenty-nine years	Thirty to forty-six years
Total cases	1570	242
Parenchymatous mastitis	3	0
Puerperal mania	1	0
Stillbirths	52 (31 macerated, 21 recent)	20 (8 macerated, 12 recent)
Died in hospital (children).	29	12
Anencephalus	1	0
Hydrocephalus	1	0
Cleft palate	1	0
Spina bifida	1	0
Genu recurvatum	1	0
Talipes	3	0
Average weight children	7¼ pounds	7⅕ pounds
Heaviest child	9¾ pounds	9¾ pounds
Lightest full-term child (not one of twins).	4⅛ pounds	4¼ pounds
Mechanism third stage:		
Schultze	86 per cent.	86 per cent.
Matthews-Duncan	14 per cent.	14 per cent.

Fifteen to nineteen years.

Total	188 cases	Contracted pelvis	4
Abortions and miscarriages	8	Prolapse of the cord	1
Average duration of labor	19½ hours	Eclampsia	2
Longest labor	76½ hours	P. P. H.	1
Shortest labor	4 hours	Parenchymatous mastitis	1
Average duration of third stage	32½ minutes	Stillbirths	4 (2 recent, 2 macerated)
Longest third stage	95 minutes		
Shortest third stage	3 minutes	Died in hospital	2
Lacerated perineums	71–39½ per cent.	Average weight of children	7⅛ pounds
		Heaviest child	9 pounds
Failure of primary union	3 or 4¼ per cent.	Lightest full-term child	5 pounds (not one of twins)
Forceps	8 or 4½ per cent.	Mechanism of third stage:	
		Schultze	83 per cent.
Breech	4	Matthews-Duncan	17 per cent.
Cesarean section for contracted pelvis.	2		

Twenty to twenty-four years.

Total number of cases	871	Twins	3
Abortions and miscarriages	6	Breech	25
Average labor	20 hours	Face	4
Average third stage	33 minutes	P. O. P.	4
Shortest labor	3½ hours	P. P. H.	11
Longest labor	110 hours	Hematoma of vulva	1
Longest third stage	3 hours	Preeclamptic toxemia	1
Shortest third stage	Immediate delivery	Contracted pelvis (9 cm. or less).	12
Lacerated perineums	435 or 50 per cent.	Average weight of children	7⅓ pounds
		Heaviest child	9¾ pounds
Failure of primary union	12 or 2⅕ per cent.	Lightest child, full term, not one of twins.	4¾ pounds
Forceps	47 or 5½ per cent.	Stillbirths	28 (16 macerated, 12 recent)
Version	3		
Cesarean section for contracted pelvis	3	Died in hospital	20
		Anencephalus	1
Extraperitoneal Cesarean section for contracted pelvis.	3	Spina bifida	1
		Cleft palate	1
Manual removal of placenta.	1	Mechanism of third stage:	
Pubiotomy	2	Schultze	89½ per cent.
Symphysiotomy	1	Matthews-Duncan	10½ per cent.
Induction of labor	1	Maternal death from acute sepsis.	1
Episiotomy for central tear.	1		

Twenty-five to twenty-nine years.

Total cases	511	Brow	1
Abortions and miscarriages	3	P. O. P.	3
Average labor	23 hours	Twins	4
Longest labor	107½ hours	Contracted pelvis (9 cm. or less).	13
Shortest labor	3½ hours		
Average third stage	33 minutes	Prolapse of the cord	1
Longest third stage	2 hours, 40 minutes	Eclampsia	3
		P. P. H.	12
Shortest third stage	Immediate delivery	Hematoma of the vulva	1
		Parenchymatous mastitis	2
Lacerated perineums:		Puerperal mania	1
Incomplete	326	Stillbirths	20 (13 macerated, 7 recent)
Complete	1		
Total	327 or 64 per cent.	Died in hospital	7
		Average weight of children	7¼ pounds
Failure of primary union	14 or 4¼ per cent.	Heaviest child	9¼ pounds
		Lightest full-term child	4⅛ pounds (not one of twins)
Episiotomy for central tear.	1		
Forceps	61 or 12 per cent.	Talipes	3
Extraperitoneal Cesarean section for contracted pelvis.	2	Genu recurvatum	1
		Hydrocephalus	1
Pubiotomy	2	Mechanism of third stage:	
Craniotomy	1	Schultze	87½ per cent.
Breech	11	Matthews-Duncan	12½ per cent.
Face	2		

Thirty to thirty-four years.

Total	173 cases	Twins	4
Abortions	3	Breech	4
Average labor	23½ hours	Transverse	1, second of twins
Average third stage	32⅔ minutes		
Longest labor	96 hours	P. O. P.	4
Shortest labor	2¾ hours	Myoma	4
Longest third stage	3 hours, manual removal	P. P. H.	1
		Eclampsia	4
		Pyelitis	1
Shortest third stage	Immediate delivery	Mitral stenosis and failure of compensation.	1
Lacerated perineum	123–72⅓ per cent.	Stillbirths	8 (5 macerated, 3 recent)
Failure of primary union	8–6½ per cent.	Died in hospital	10
Forceps	49–28⅘ per cent.	Average weight of children	7¼ pounds
		Heaviest child	9¾ pounds
Version	1	Lightest full-term child	5 (not one of twins)
Manual removal of placenta	2		
Pubiotomy	2	Mechanism of third stage:	
Contracted pelvis (9 cm. or less).	4	Schultze	84 per cent.
		Matthews-Duncan	16 per cent.

Thirty-five to thirty-nine years.

Total cases	53	P. O. P.	1
Abortion	1	Antepartum hemorrhage	2
Miscarriages	2	Myoma	2
Average labor	25⅘ hours	P. P. H.	1
Average third stage	30 minutes	Stillbirths	7 (2 macerated, 5 fresh)
Longest labor	99½ hours		
Shortest labor	3½ hours		
Longest third stage	60 minutes	Died in hospital	2 (cerebral hemorrhage, congenital syphilis)
Shortest third stage	Immediate		
Lacerated perineum	41–82 per cent.		
Failure of primary union	3–7⅓ per cent.	Average weight of children	7⅓ pounds
		Heaviest child	9¼ pounds
Forceps	15–30 per cent.	Lightest child (full-term)	4¼ pounds (not one of twins)
Version	1, transverse and prolapsus funis	Mechanism of third stage:	
		Schultze	86 per cent.
Craniotomy	1	Matthews-Duncan	14 per cent.
Contracted pelvis (9 cm. or less).	2		

Forty to forty-six years.

Total cases	16	Transverse	1 second of twins
Average labor	19⅓ hours		
Average third stage	30 minutes (29)	Myoma	1
		P. P. H.	1
Longest labor	51½ hours	Preeclamptic toxemia	1
Shortest labor	6½ hours	Stillbirths	5 (1 macerated, 4 fresh, 2 twins in eclampsia and 2 cord around neck)
Longest third stage	75 minutes		
Shortest third stage	15 minutes		
Lacerated perineum	10–62½ per cent.		
Failure of primary union	0		
Forceps	4–25 per cent.	Average weight of children	6⅘ pounds
		Heaviest child	8½ pounds
Version	1, on second of twins	Lightest child, full-term	5 pounds (not 1 of twins)
Manual removal of adherent placenta.	1, myoma and macerated child	Mechanism of third stage:	
		Schultze	88 per cent.
Twins	2	Matthews-Duncan	12 per cent.

DISCUSSION.

DR. HUGO O. PANTZER, Indianapolis.—I wish to touch briefly on a few points having a fundamental bearing upon the subject so interestingly and fully presented by the essayist. The difficulty of lactation encountered in these cases no doubt often rests in the chronic toxemia, which by timely anticipation and treatment can be successfully met. The dread of childbirth which these women and their doctors have no doubt is a forceful influence in bringing about disaster at the time of labor. I would look for no more than a protracted labor in most women bearing late, notably, when they have not suffered from excessive muscular occupations, or grave toxemias. With the proper assurance felt and expressed by the accoucheur, and proper time given nature, these women should do better in labor than is usually the result.

THE TREATMENT OF ABORTION ON THE BASIS OF ITS PATHOLOGY.*

BY

CHANNING W. BARRETT, M. D.,

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Chicago.

No small percentage of gynecologic cases, and at least a small percentage of neurologic cases, date their beginning from an abortion or a series of abortions.

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* Read before the American Association of Obstetricians and Gynecologists at Buffalo, Sept. 15–17, 1914.

A history of abortions means in most cases a history of infection. Endocervicitis, endometritis, subinvolution and adnexial disease are common. Sometimes, we must admit, the abortion is due to the previous although unrecognized pelvic disease; but more often, perhaps, the pelvic disease is the result of a produced or neglected abortion. The frequency of complications and sequelæ of abortion are to be accounted for largely, first, by its etiology; that is, being produced, there is opportunity for trauma and infection; or, being spontaneous, we have the general or local disease which induced it. Second, its incompleteness, portions of the ovum remaining as a foreign body and a culture medium. Third, its uncertainty as to time of onset leading to unpreparedness. Fourth, the length of time it continues leading to neglect and opportunities for infection. Fifth, its criminality, the desire to cover, which leads to neglect and errors in treatment. Sixth, the continuance of household or other duties while the abortion is incomplete, or too early resumption of duties afterward.

No such percentage of evil results follows therapeutic abortions as does the criminal or spontaneous abortion. If one method of abortion takes a person in the pink of health and results in a high percentage of mortality or morbidity, and another method takes the patient with heart, kidney or lung lesion calling for a therapeutic abortion and results in almost universal good results locally and improvement in the lesions of other organs, it is well to study the methods of the latter procedure and apply them as nearly as possible to the treatment of the former. The therapeutic abortion differs from others largely in the care given the patient and its completeness; no such methods being used to start the abortion and then allowing it to continue and become infected. At one sitting under surgical conditions, the uterus is dilated and completely emptied, after which good recovery is almost certain. It will be urged that therapeutic abortion has not the opportunity for infection that the criminal abortion has, but the opportunity for infection in criminal abortion is not alone in its inception, but also in its neglect. In spontaneous abortion the ones that are promptly complete are almost without mortality or incident if the patient is given a few days rest. The ones that are incomplete furnish the infections, the complications, the mortality and morbidity. In criminal abortions the above holds true to a large extent. In a study of 274 abortions by Titus, 162 were classed as incomplete, while thirty-five were counted complete; some being rated as "threatening," inevitable therapeutic, etc. Twelve of the thirty-five "complete" abortions had a temperature above 101°, but no case died in this class. Seventy-three of the 162 incomplete abortions were infected, with five deaths. Thus 6.58 per cent. of the infected cases in incomplete abortion, or 3.7 per cent. of all incomplete abortion died. Thirty-two of the forty-one criminal abortions ran a temperature above 101°. The remaining nine cases recovered, while five of the thirty-two infected cases died. Thus no death occurred in complete abortion or in noninfected abortion, and, therefore, incompleteness and infection run hand in hand in producing a mortality, and while no statistics are given as to morbidity we can reach no other reasonable conclusion than that a considerable morbidity was shown later.

Statistics differ widely as to the relative number of abortions, and it is likely that careful questioning of patients does not arrive at the whole truth. A large series of histories were studied for the purpose of determining this point, and it was found that about two out of every five pregnancies terminated before viability. As this proportion occupies a middle ground among other statistics, it may perhaps be considered fairly near the truth. Only a small percentage of abortions may be considered complete. Absolute completeness can only be determined at the time by exploration, and this test has scarcely ever failed to find placental débris. Only a small amount remaining adherent is sufficient, as has been demonstrated time after time, to keep up hemorrhage and result in a deciduitis and endometritis, metritis and subinvolution of long standing.

Four cases observed within the year were thought, by the apparent intactness of the ovum and cessation of the symptoms, to be complete and yet an exploration necessitated by continued hemorrhage and slight rise of temperature discovered a very small piece of placental tissue in each case. A large number of cases seen at the County Hospital and a moderate number of private work contradict flatly the oft-repeated theory that the uterus may be counted upon to empty itself. The uterus and the ovum are unripe for separation, and almost invariably some portion remains. This may continue for some time without a severe infection taking place, but it leaves no doubt as to its tendency in that direction. The placental tissue as a foreign body serves to favor the development of any infection that may have been introduced, and also tends to make this the *locus minoris resistentia* for infection within the body. Not only this, but the continued or oft-repeated hemorrhages call for attention on the part of the patient that eventually lead to infection. There seems to be no comparison between a complete and incomplete abortion to develop infection, and little comparison in the two in their capacity for harm if infection has taken place. Almost the entire mortality of abortion come from infection, and yet no little morbidity is possible without any considerable infectious process.

The uterus being interrupted in its development involutes less readily than at term under the most favorable conditions of an abortion, but with retained portions of the ovum hemorrhages take place which result in anemia, and subinvolution and deciduitis are induced which may serve as the etiologic factor in a subsequent abortion.

This paper has been suggested by the fact that the treatment of abortion, like the treatment of appendicitis and extrauterine pregnancy, has its advocates of the let-a-lone policy. Formerly a small and decreasing number taught that the incomplete abortion should be left alone unless infection was present. Within the last few years there has been a wave of stand-by-and-see-what-occurs policy advocated even when infection has taken place. This must be viewed in the light of the pathology which is found to be,

1. Such pathologic conditions as furnish the etiologic factor in the abortion; as, for illustration, syphilis, tuberculosis, anemia, diabetis, displacements, tumors, endometritis deciduitis, etc.

2. Such pathologic conditions as are affected by the pregnancy; as, for instance, lung, kidney and heart lesions.

3. Such pathologic conditions as are coincident but which may be neither the cause nor the result of abortion, as pelvic floor lacerations, cystocele, hemorrhoids, etc.

4. The pathology of the abortion itself, which is as a rule incompleteness, and in a large percentage of cases infection. The infection may result from an unclean attempt at abortion or may occur during the mismanagement of an incomplete abortion. Trauma of the uterus occasionally occurs. The varied pathologic picture is made up of a uterus struggling with a more or less attached foreign body partially alive, partially gangrenous, partially loosened, allowing hemorrhage to take place to the point of anemia, lowered resistance, and exhaustion. The uterus meanwhile squeezing and traumatizing the remains of the ovum, and the presence of the ovum keeping the lymphatics and vessels open, and this traumatizing and damaging process going on frequently in the presence of infection varying in virulence from saprophites to streptococci. This results in leukocytosis and infiltration and exudates in and around the uterus. Small or larger uterine vessels become plugged with thrombi. In spite of this protective process bacterial invasion takes place and septicemia and pyemia result, and localized proc-

esses of infection take place in adjacent or distant organs. The peritoneum, liver, heart, lungs, kidneys, joints and other organs and structures are involved. The usual lay treatment of a long-continued incomplete abortion favors the introduction of infection, and the continual unrest on the part on the uterus favors its introduction into the tissues of the host. The treatment, then, of abortion is suggested by its pathology:

1. As a prophylactic measure women of a child-bearing age should be kept as nearly as possible free from the pathologic conditions which cause abortion. Syphilis thoroughly treated, displacements corrected, deciduitis removed, etc.

2. Conditions threatening abortion should receive attention, such as the removal of an ovarian tumor, or sometimes a fibroid or an incarcerated retrodisplaced pregnant uterus restored to position, operatively or nonoperatively.

3. An occasional patient requiring a therapeutic abortion in the early months should be anesthetized in a manner that will best conserve her forces and the uterus should be completely emptied at one sitting. A patient whose health requires that they should not go to term should usually be rendered sterile at this or some future sitting.

4. Threatened abortion should be treated by rest and sedatives.

5. Inevitable abortion is in good condition only when the uterus is empty. Bleeding or not bleeding, working or at rest, infected or noninfected, we know of no condition that leaves the uterus in a more favorable condition by reason of a partial or complete ovum within its cavity. As the complete noninfected abortion is altogether more desirable than the incomplete, so to a greater extent is the complete infected abortion less undesirable than the incomplete with the same kind of infection. We are told that saprophitic infection is all that works upon the ovum, but a greater fallacy could not exist. Many a retained placenta is attached enough to make it a culture medium for pathogenic bacteria without resistance to overcome them. Its removal will remove the source, a factor counted so important in acute and chronic processes at the present. Some are fond of saying that our present conception of immunity teaches that the immunizing forces are the greatest factors in overcoming infection. I would say that our present knowledge of bacterial invasion and body immunity teaches that sometimes the body conquers and sometimes the bacteria win, and the former is more apt to take place if the bacteria hosts are depleted at their source. Two important and rational questions may arise in connection with a

case of badly behaving abortion: first, is there retained structure and, second will the removal of the same if present do damage to the protecting forces that more than offset the advantages to be gained by its removal? A considerable experience teaches me that the former can only be guessed by symptoms and verified by exploration, and that infection to any considerable extent and bleeding indicate that abortion is incomplete. To avoid damage to the protecting forces the uterus should be explored with the view of removing foreign material, and not with the idea of doing a curettage in acute cases. The finger and proper placenta forceps should be used largely in place of the curet and the wall of the uterus should be attacked as little as possible. In this way we have made the benefits outweigh the evils in a large series of cases. If one's method of emptying the uterus does not do this, he must decide whether he will change his method or leave the material for the uterus to carry on the struggle.

6. Lastly, at the time of a therapeutic abortion or the emptying of a noninfected abortion, certain vaginal repairs have occasionally been performed and rectal work has been done. A few days, or in infected cases a few weeks, after a completed abortion has frequently been chosen as a favorable time to correct a weak floor or replace a uterus.

The accidental fracture of a bow-leg may be made the first step toward correction of the deformity. The forced period of rest may be elected as the time to correct the condition which caused the abortion, or results in ill health. Such good results are obtained that I am convinced that this work will grow in the hands of one who gives it a fair trial. In conclusion I would say that,

1. Abortions show a high percentage of incompleteness.
2. Infection is frequent and causes a considerable mortality and high morbidity.
3. The mortality of infection in abortion is almost entirely in incomplete abortion.
4. An incomplete abortion should be rendered as nearly like a therapeutic abortion as possible by removing uterine contents without damage to the protecting uterine wall.
5. Contraction of the uterine body into a firm mass is to be encouraged.
6. At a safe time and before the patient leaves the hospital many pelvic conditions may be corrected to the advantage of the patient and future pregnancies.

25 EAST WASHINGTON STREET.

DISCUSSION.

Dr. William H. Humiston, Cleveland, Ohio.—Mr. President: There are one or two points I wish to make in reference to abortion to aid in determining as to whether the uterus still contains the products of conception or some portions of it. In the great majority of cases it is easily determined, and when we cannot determine it we should explore and find out. *If the uterus remains enlarged and the os patulous* (whether there is irregular flowing or not) you will find the retained products of conception within the uterus.

Dr. Asa B. Davis, New York City.—We see a large number of abortions in the Lying-In Hospital services, both indoor and outdoor, and after treating these cases and watching them for a long period of years I think we are generally of the opinion that there is no such thing as complete abortions, at least, we do not find them. We cannot be sure until we have explored the uterus, and for that reason we generally adopt the routine treatment of cleaning out the uterus in every case of abortion that comes to us. I heartily approve of Dr. Barrett's ideas. In therapeutic abortion there is some difficulty in packing and dilating the cervix, I think it is much better to do an operation where a therapeutic abortion is indicated at one sitting, and it can be done quickly and safely and thoroughly, whereas if you pack and wait, the agony is carried over a number of days and the patient is subjected to unnecessary irritation and anxiety.

Dr. Charles L. Bonifield, Cincinnati.—I have enjoyed Dr. Barrett's paper very much. It is timely, and I quite agree with him that whenever there is abortion the uterus should be cleaned out. There are two points that I cannot absolutely agree with. The first one was about giving these patients ether. Ether in my opinion is one of the greatest stimulants on earth, and I never hesitate to give a patient ether who is suffering from sepsis or from hemorrhage.

The other remark made needs a little shading, so to speak, and that is, this is a good time to effect repairs. My experience has been that we cannot correct bad lacerations such as those through the sphincter or a vesico-vaginal fistula, at this time. We cannot do that successfully until involution has taken place. The structures will not hold the stitches, and while we may be able to repair the minor things after abortion, I think it is a mistake to try to make these repairs that require expert work.

Dr. Abraham J. Rongy, New York City.—There are two types of incomplete abortion brought into the hospital service. One in which we find the cervix entirely closed, uterus contracted with the hemorrhage entirely stopped. In the other the uterus is soft, showing retained secundines. If we curet these former cases we undo what Nature has done. Those patients in which bleeding has ceased do not need to be curetted. On the other hand, in those cases having open cervix, the procedure will depend upon the period of pregnancy. I do not think it is wise to empty the uterus in one sitting in these cases of abortion, whether it be two months or four months. I have attempted once or twice to empty the uterus at three or four months and found myself in trouble. In cases of incomplete abortion before the eighth week I curet, but in cases that have gone beyond this period, I introduce a bougie or catheter and at the end of twenty-four hours the product of conception is expelled by the uterus. It is dangerous to empty a uterus at one sitting that is three or four months pregnant. It not only cannot be done safely but there is danger of perforating the uterus.

DR. BARRETT (closing).—My purpose in presenting this paper was largely from the fact that there have been a goodly number of men, and some of them rather prominent men, who in the last few years have advocated the leaving alone policy of abortion, unless the hemorrhage was so great that the contents of the uterus should be removed to stop it, no matter whether there was infection or not. A large series of cases has demonstrated that when a uterus is once emptied and can be made to contract, the opportunity for other infections to do harm is decidedly lessened, and these patients usually make a prompt and decided recovery.

In answering Dr. Bonifield's question I suppose that it is entirely permissible for the President to take a nap once in a while (laughter), and so will say the point that he questioned was covered in the paper.

As to the other point, he brought up the question of it being inadvisable to do this line of repair work after abortion. I do not think any one questions for a minute that I would stand up and advocate that line of treatment if stitches absolutely did cut out at that time, as he says. As a matter of fact, we have tried it in the Cook County Hospital where these patients come in great numbers, in all degrees of abortion, and some of the cases that are perfectly clean are attended to by immediate operation, doing a thorough perineal operation. Whether there is complete laceration or incomplete, there is no more favorable time for healing to take place than at that time. The only thing is the tissues are a little tender to work with, and a novice would find the flaps hard to deal with, but as far as good healing is concerned we will never have a time that will be better. In the cases that come in with a temperature of 102–103°, we would not think of doing this immediately upon cleaning out, but after emptying the uterus we allow the temperature to subside, and then repair as these patients may never be in the hospital again. They would go on and suffer with their condition; they are working people, they do not like to give up to go to the hospital, and this is their opportunity for recovery. A very energetic assistant will get lots of these cases for operation, and they can be very much benefited by the repair work which they receive at that time.

Now, going back to the question of anesthesia, I would say it was in the cases where a therapeutic abortion was to be done for tuberculosis or a kidney lesion, that we do not like to subject the patient to complete anesthesia, because we have seen cases who have had complete ether anesthesia that went down very rapidly when they had tuberculosis.

As to the question of the patulousness of the os determining whether there is material in there or not, of course there is a tendency for the os to remain open when there is material in there, and we can determine that by palpation; but there are oftentimes great quantities of material in the uterus with the os perfectly contracted and it is very difficult to dilate it sometimes. I believe it would be dangerous to teach that all cases of acute abortion should be curetted. I believe it is rather dangerous to teach that any of them should be curetted, and so we advocate not curettage in these cases but the removal of the foreign material without curettage.

TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

Stated Meeting held November 10, 1914.

The President, Joseph Brettauer, M. D., *in the Chair.*

Dr. Geo. Gray Ward, Jr., presented a report of a case of

UTERUS DUPLEX AND DOUBLE VAGINA COMPLICATED BY INTERSTITIAL FIBROIDS.

Dr. Ward described the history of the case as follows:

The patient, Miss E., aged thirty-three, unmarried. The family and personal history was negative. Menstruation was delayed until the eighteenth year, but was then regular in occurrence, of the twenty-eight-day type, moderate in amount, of from four to five days' duration and free from pain. Two years previous to operation, when the patient was thirty-one years of age, the menstruation began to increase in amount and occurred every ten to fourteen days. It was accompanied with considerable pain. Ten days previous to entering the hospital, the patient began to suffer with severe pain in the lower abdomen, chiefly on the right side.

Examination showed the patient to be well nourished, but undersized and presenting degenerative stigmata—short phalanges of the hands and feet, and the chondrodystrophic type being especially noticeable.

The pelvic examination showed that the patient had a perfect double vagina, two cervices, and two separate uterine cavities. At the right side of the pelvis was an irregular mass which was firm in consistency and connected closely with the uterus.

The cystoscopic examination made by Dr. Furniss showed that both ureters were normal, but that the posterior wall of the bladder was shoved forward to a slight extent, thus dividing that portion of the bladder into two cavities.

The radiographic examination showed that the arms, hands, feet, legs, hips, and shoulders had all the essential changes of chondrodystrophia. There was an irregular circular shadow in the pelvis at a point opposite the sacral promontory, suggestive of an area of ossification within some rounded body, which might be a fetal head or a calcareous degeneration of a tumor.

On April 24, 1914, on account of hemorrhage and pain, Dr. Ward performed a panhysterectomy, leaving both adnexa, which were normal, *in situ.* The patient after a normal convalescence made a complete recovery.

The specimen shows two distinct cervices and anteriorly between the cervices may be seen the place of attachment of the septum of the vagina. There are two uterine cavities quite distinct one from the other, both well formed and of equal size. Two catheters of different colors have been passed through the cervices into the uterine cavities. The outline of the fundus is that of a normal uterus except for the fibroid in the wall, of which I will speak later, and there are numerous fibromata scattered throughout the body of the uterus. In the cervix is one that shows evidence of recent hemorrhage and degenerative changes.

The etiology of malformed uteri is not definitely understood, but has been attributed to an adhesive peritonitis in early embryonic life, and to a faulty intercorrelation of the internal glands of the body. The symptoms of such malformations are often slight or absent until the establishment of menstruation or a pregnancy directs attention to the condition.

The treatment depends upon the type of the malformation. The condition usually requires no interference unless pregnancy or—as in this instance—a new growth occurs in the uterus.

DR. CHARLES G. CHILD, JR., presented a case of

SIMULTANEOUS ABORTION AND TUBAL STERILIZATION.

The salient features of this case were described as follows:

Mrs. A. B., thirty-three years old, para-iv, was first seen on March 13, 1914. At this time she was four and one-half months pregnant, and suffering from marked symptoms of a breaking cardiac compensation associated with mitral stenosis. With her previous pregnancies the heart condition had been bad and with the last pregnancy two and one-half years ago, the uterus was emptied at three months.

In referring the case to Dr. Child for a termination of the pregnancy her physician strongly recommended that measures be taken as well to prevent any further pregnancies as he had attended her in the last three ones, and in each the cardiac condition had been progressively worse. In his opinion the condition of her heart was such that pregnancy was a distinct menace to her life.

The details of the operation performed on March 14 are as follows:

Transverse suprapubic abdominal incision, 3 inches in length. The uterus was drawn up to the wound and a transverse fundal incision made from horn to horn into the cavity of the uterus. Through this incision the gestation was removed, the cervix dilated, and the uterine cavity packed with iodoform gauze. The emptying of the uterus was accomplished with far greater celerity and ease than when done through a median uterine incision, and was attended with much less bleeding from the uterine wall. The sterilization was then easily accomplished by cutting out the cornua at either angle of the uterine wound and ligating the ends of the tubes. These ligated ends were then tucked down the sides of the uterus between the folds of the broad ligaments and the uterine incision closed with a three-layer suture of chromic catgut. The abdominal wound was closed in layers, the peritoneum with kangaroo tendon, the fascia and skin each with a continuous mattress suture of silkworm gut.

The period of convalescence was uneventful, the highest temperature recorded being 101.2° F. with a pulse of 102 on the first day. The temperature came to normal with a pulse of 98 on the second day. The uterine gauze was removed on the third day and the patient was out of bed on the seventh day. The abdominal wound healed by first intention, and the silkworm gut sutures were removed on the fourteenth day.

DISCUSSION.

Dr. J. O. Polak considered the procedure described as being rather new. He had emptied the uterus several times after the manner of Dr. Harris, excising the tubes, etc., but Dr. Child's method did away with two excisions and seemed to him a most excellent plan. The control of the hemorrhage seemed to be very easy. However, he considered one ought to have the privilege of seeing the operation before forming a definite opinion, because what one operator might consider an undesirable proceeding, was apparently a totally different proposition in Dr. Child's hands.

Dr. Robert T. Frank said that in his opinion tubal sterilization in the presence of pregnancy should be avoided and the preference given to other operations. There was no question that this was a clean case, but the procedure adopted by Dr. Child greatly increased the danger of infection. It appeared to him, therefore, that in a case of this kind the more conservative plan would be to induce labor from below and, if necessary, to remove the tubes by a vaginal operation at a later date when the smallness of the uterus would make this procedure very easy. Women in the condition described by Dr. Child were poor subjects for operation, and they should not be exposed to the considerable risk involved. The conservative plan was usually successful.

Dr. Hiram Vineberg referred to two of his own cases in which he had resorted to sterilizaton of the tubes. He had done so through the abdomen, first emptying the uterus from below, and then sterilizing the patient. Both patients made a good recovery. He had given much thought to the idea of doing the two operations at one time, but he hesitated to adopt it, because there was considerable danger of infection even with the greatest care. There was a great deal of hemorrhage to arrest and, according to his experience, he was rather in favor of emptying the uterus first and then leaving the process of sterilization for a later operation.

THE CHAIRMAN said he would like to emphasize Dr. Vineberg's remarks a little more strongly. Given a multipara with a wide open cervix, presenting no difficulty whatever for inducing labor, or if labor has to be induced in a hurry, an anterior section could be done in no time and without much bleeding. This was infinitely less interference, than by operating upon the uterus from one corner to the other and then sterilizing the woman by tying the tubes. Personally, he would strongly oppose a measure of that kind, which should be only employed when there was a strict indication for it. In his mind that had been missing in the present case. There was always time to sterilize a woman, if she could not be prevented to become pregnant in any other way.

DR. CHILD, in closing, explained that in his case the heart was not a serious factor and presented no contraindication to the method he had adopted, and it had not taken him more time to do the two operations together, than merely emptying the uterus. Dr. Vineberg had referred to excessive bleeding by the vaginal route. With the increased congestion in pregnancy there was most assuredly excessive bleeding from the vagina, but in his case the hemorrhage was perfectly controlled. Besides, there was plenty of time to sterilize this woman, and that was another reason for employing his method. Two and a half years ago he had had a similar case, where the cervix was very small and could not be dilated sufficiently. He emptied the uterus, the patient promising to return later for subsequent sterilization, but she never did. After two and one-half years she became pregnant again, and the same operation had to be repeated. This experience had caused him not to accept any promises again.

DR. VINEBERG rose to correct a misunderstanding. He had not referred to hemorrhage from the vagina, as Dr. Child seemed to have understood, but to bleeding from the uterus itself.

THE CHAIRMAN said that the closing remarks of Dr. Child had imparted some information which they had not had before, as it was now clear that the incision had already been made. As a rule, however, he would adhere to what he had said before, although he admitted that the proposition was different when there was a rigid cervix to deal with. He felt sure that every member would agree with the moderate employment of Dr. Child's operation, when limited to indicated cases, but he did not feel that this Society should allow radical advice of this kind without emphasizing its limitations and the dangers to which it gave rise.

DR. JOHN O. POLAK reported two cases of

DYSTOCIA FOLLOWING VAGINAL SHORTENING OF THE ROUND LIGAMENTS.

CASE I.—Mrs. D. G., U. S., aged twenty-three, hospital record 11444, admitted May 3, 1911. Married five years. Always well as a child, menstruated at thirteen years, cramp-like pain on the first day, last period two weeks before admission.

Delivered in 1909 of an R. O. P. of a dead born child with instruments. Appendix removed three weeks postpartum by Dr. Chas. Jewett. Entered into Jewish Hospital, complaining of backache and leucorrhea.

The preoperative physical findings showed a bilateral laceration of the pelvic floor, a laceration to the right of the median line, through the posterior lip of the cervix. Retroflexion and moderate decensus with no appreciable adnexal enlargement.

Operation May 4, 1911, cureting, trachelorrhaphy, T-shaped incision of anterior vaginal wall, bladder raised and separated from anterior uterine wall, vesicouterine fold exposed and incised, uterus anteverted and round ligaments folded and sutured to the anterior wall of uterine body (modified Coffey), vesicouterine pouch closed, anterior colporrhaphy, bringing the base of the broad ligaments in front of the uterus. The procedure was finished by an Emmet-Holden perineorrhaphy. She was discharged from the hospital May 16, 1911, with a perfect pelvis.

On May 14, 1914, she was sent to the hospital in labor by Dr. Beach. The findings at that time, after some fourteen hours of active labor are interesting. The pelvic measurements at both brim and outlet were ample, the cervix pointed upward and backward above the promontory, the anterior uterine wall was immensely thickened and wedged into the brim of the pelvis, no presenting part was appreciable, even with the whole hand in the pelvis, so dense was the anterior uterine wall. The fetus had developed in a bay window made up of the posterior wall. A section was done and the preoperative findings verified, the adhesion of round ligaments to the anterior uterine wall had prevented its participation in the developmental process. Her recovery was uneventful.

Case II.—Mrs. A. C., married, aged thirty-three, hospital number 19008, admitted January 8, 1913. Had been the subject of many operations as noted in the following history. Menses began at thirteen, regular, five- to eight-day type, had pain before marriage; last period ten days before admission.

Married eleven years, three children, youngest born September, 1906, no miscarriages.

Principal symptoms: bearing-down pain in pelvis and lower abdomen, increased at menses and on walking, backache, leukorrhea and constipation.

Physical examination: deep bilateral laceration of the pelvic floor, deep tear of the cervix extending into right broad ligament, fixing uterus and shortening right parametrium, uterus retro- and sinistraverted.

Operation: January 11, 1913, cureting, amputation of cervix, anterior celiotomy, round ligaments caught and loops sutured to vagina with silk sutures, as described by Vineberg, vesicouterine pouch closed, perineorrhaphy. On discharge, uterus was in anteversion.

On May 20, 1914, she reentered the hospital and had her appendix removed through a right rectus incision, note being made at that time of the condition of the pelvic organs: uterus anteverted, movable; adnexa normal.

She again entered the hospital, August 14, 1914, in the obstetric service of Dr. O. P. Humpstone, in labor, child in a transverse presentation, left scapula anterior. Vaginal examination failed to locate the cervix, until the whole hand was passed into the vagina, the cervix being found obliterated, pointing backward above the promontory. Quoting from Dr. Humpstone's history; "Cesarean section was done, and on opening the abdomen, the anterior uterine wall was found in a mass of adhesions, two coverings of peritoneum over anterior surface of uterus, arresting its development, fundal incision, uterus not delivered into abdominal wound because of adhesions. Bladder carried high on anterior face of uterus; entire development in posterior wall."

These two cases show that dystocias can follow vaginal shortening of the round ligaments.

DISCUSSION.

Dr. W. E. Studdiford thought that the manner of folding the broad ligament possibly had a great deal to do with the dystocia in these cases. It seemed to him that it interfered with dilatation of the cervix in the same way that resection of the broad ligament might interfere with the success of the case. As he understood the report, the adhesions in the two cases were very different, that is, the round ligament had stretched in the first case, and in the second case the vagina interfered with the anterior wall, so that he did not believe, from his study of the report, that the interference with the round ligament was the cause in both cases. In the second case the fixation to the vaginal wall and the change in the direction of traction was the cause of the dystocia.

Dr. Vineberg had done this operation about thirty or forty times, but this was the first in which there was dystocia. He did not know whether Dr. Polak followed the same technic as he did. He was exceedingly careful not to do any injury to the anterior wall of the uterus, when passing the suture. He thought the whole difficulty was the danger of adhesions between the anterior wall of the uterus and the vaginal wall, and injury in loosening them could not be avoided. If a case was more favorable and there were no raw surfaces, there was very little danger of any dystocia. In the way he did the operation, the worst that could happen was that the woman aborted in the fourth month, but none of his cases had had severe dystocia.

Dr. Polak, in closing, said he had been very careful in his procedure in bringing the peritoneum and the ligament together, so that the body of the uterus was absolutely free so far as any possibility of adhesions to the vaginal wall was concerned.

The paper of the evening was entitled

STROMATOGENOUS TUMORS OF THE UTERUS,*

and was read by DR. L. W. STRONG.

DISCUSSION.

DR. JAMES EWING thought that the paper of the evening had been extremely interesting and profitable, and he wished to congratulate Dr. Strong on having successfully constructed such a paper in a most difficult theoretical field. American literature was rather deficient in theoretical discussion of many important problems the pursuit of which usually requires one to read German, French or Italian. Dr. Strong's contribution in this field was therefore to be welcomed, especially since he brought to the field of gynecological pathology long training as a general pathologist.

In the attempt to establish a new nomenclature for a well-known group of tumors Dr. Strong had, however, essayed a peculiarly difficult task. It was extremely difficult for any person or institution or even any organized body of authorities to introduce a new nomenclature for tumors. For example, the "Committee on Nomenclature of the International Association for Cancer Research"; had been holding conferences over two triennial periods in the effort to reach some uniform basis of nomenclature. They have not yet finished their report, and until they do it is perhaps hazardous for individual authorities to proceed on their own initiation. In regard to the question of the origin and growth of malignant myomatous tumors of the uterus he did not think that rigid rules could at present be formulated. It was easy to deduce unalterable laws governing the growth of tumors but it had proven hazardous to do so. Thus Ribbert once stated the principle that true tumors grow exclusively from their own resources, "aus sich heraus," but later he had to admit that during the period of inception, when the focus of origin is defining itself, normal tissues may be gradually drawn into the tumor process, which is equivalent to saying that tumors do not always grow from their own resources. Each tumor has rules of its own which must be ascertained by close study of each particular variety.

As for the transformation of benign myoma into malignant myosarcoma, he felt that clinical experience and histological study had demonstrated that the change actually took place. He saw no reason why an adult myoma cell could not begin to grow and become anaplastic and malignant. Yet many benign myomas contained cellular growth centers, the presence of which did not constitute a sarcoma. Extreme cellular portions of adult myomas were occasionally seen in which the clinical history had proven the long existence of a slowly growing tumor which had suddenly started to grow rapidly. With such evidence be thought it safe to conclude that a malignant change had occurred, and that the tumor was properly called a myosarcoma. He did not think

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* For original article see page 230.

that the connective tissue had ever been proven to be the source of such a malignant process in a myoma.

Dr. Goodall thought that the paper was interesting inasmuch as a number of statements brought forward were calculated to stimulate thought. It opened up such an unusual discussion that one hardly knew where to begin. One of the first questions was that of metaplasia. In his opinion they must all agree that metaplasia takes place without doubt, but then it was necessary to consider to what degree. If it was assumed that a cell that had undergone wide transformation, could revert to a cell of another tumor, they would all agree, but there were also other cases.

As to epithelioma, he looked upon this tumor as more highly developed than sarcoma, but not so highly as carcinoma, and yet he had had specimens in which metaplasia was undoubted and where there was a typical arrangement of sarcoma particularly in malignant disease of the small intestine. In the last five years he had had five cases. If they knew that the endoderm was also the progenitor of the sarcoma, the two had apparently the same origin. In the ovaries the same process took place. Yet they knew that they arose from the same type of cell as the ovum, and in his experience epithelioma of the ovary had been eight times more common than sarcoma, for the reason that the tissue cells in the ovary are more highly differentiated. To his mind there was no reason why muscle cells should not undergo malignant growth or degeneration just as well as connective-tissue cells, but he thought that the muscle cells proper were more highly differentiated than connective-tissue cells. The more highly differentiated, the less need there was for it to undergo malignant development. Muscle and fibrous tissue were very commonly associated, but not to the same degree as other cells. He had never seen a case of true myoma undergo malignancy. A true myoma contained no fibrous tissue. He had seen two cases of myosarcoma, but they were not tumors. They were metastases from a change going on in the uterus and there was no tumor formation.

When studying this type of cells, he thought the uterus and the genitals were the most difficult parts of the body for differentiation of the cells and for drawing conclusions. When examining very carefully all tumors of residual cells in the genital tract which had not undergone high differentiation, but remained in the embryonal stage, it was found that they must be degenerated into malignant tumors.

As to fibromyoma, the percentages differed. He had just looked over twelve specimens chosen from 250 cases and that was the highest percentage he had ever seen. It practically amounted to 5 per cent. In his own experience of 700 cases, the percentage had been vastly below that figure. Many of these were adenomata and not malignant. Dr. Strong's argument was very plausible that the percentage of malignancy was high. Metastases from fibroids were exceedingly rare and he personally had never seen a case. He felt convinced that many cases were malignant, if malignancy could be diagnosed with the microscope, and that brought up the question whether that was reliable or not.

Dr. Robert T. Frank said that he no longer had much sympathy with morphological hair splitting. The constantly growing terminology arising from such theorizing is mystic and resembles the quibbling of the Dialecticians of by-gone days.

We know nothing concerning the cause of cancer, which term includes both carcinoma and sarcoma. We know, however, that in response to various stimuli surface epithelial cells may assume atypical forms and atypical distribution (nonmalignant), and as the result of other factors true squamous-celled carcinoma may develop. On the other hand, glands respond to similar stimuli in the form of hyperplasia (nonmalignant), adenoma, adenocarcinoma and solid carcinoma.

In a similar way various graded changes are found in mesodermal (connective tissue) structures. In the uterus they take the form of fibroma (almost always combined with some muscle tissue), myoma, metastasizing myoma and sarcoma (fibro-, round-celled, polymorphous). Mixed tumors, containing various mesodermal structures (cartilage, fat, striped muscle) and epithelial constituents (glands) belong to both groups.

Further than this our knowledge does not extend; to attempt to deduct from the fixed microscopical section whether a sarcoma develops in a fibroid from the muscle cells by degeneration, or whether it originates from a preexisting focus subserves no purpose and promises no ultimate advance.

Clinically, sarcomata of the uterus are of three kinds. Cervical growths are mainly of the polypoid variety (usually mixed tumors). Endometrial growths are polypoid, or sometimes diffuse; and myometrial are either diffuse (very rare) or discrete (in fibroids, or appearing as separate encapsulated nodules). Their histological criteria have been fully described by Dr. Strong.

The diagnosis of cervical growths can be confirmed by microscopic examination. The curet enables a similar examination to be made on polypoid endometrial sarcomata. The myometrial variety is rarely diagnosed before operation and then only tentatively, when rapid growth or extension to neighboring parts becomes apparent. The great majority of cases are recognized accidentally in the laboratory.

The microscopical diagnosis in border-line cases is usually questionable. Again and again in a given specimen authorities differ in their interpretation, and only the subsequent clinical course may determine the question.

For in the uterus even more than in most other regions of the body the malignancy of sarcomata varies greatly. As a rule, however, sarcomatous areas within fibroids are least malignant, and diffuse growths show greater malignancy.

That some sarcomata of the uterus in some ways resemble certain bone sarcomata, which may be cured by simple decortication, becomes apparent when the few recurrences, reported after supravaginal hysterectomy, are considered. Statistics of carefully examined series show from 1 to 10 per cent. of sarcomatous fibroids, yet yearly throughout the country hundreds of hysterectomies are performed (uncontrolled by examination), the patients remaining well.

To emphasize this point Dr. Frank quoted a case of Dr. Brettauer's where the level of amputation through the cervix actually grazed a sarcomatous area in a fibroid, and yet this patient has remained well for over a year.

Dr. Geist said that the pathologist who looked through the microscope differed very often with the interpretation of another man. He thought that to a great extent the reason these tumors did not occur so frequently was because they were encapsulated. The opportunity for either metastases or contact tumors to occur was great, especially for the endometrium of the uterus, but metastases or recurrences do not often happen. At the Mount Sinai Hospital, in two cases a diagnosis of fibroid was made, but in others they had to change the diagnosis.

Dr. Strong closed the discussion. He could not see that there was any fundamental difference in Dr. Ewing's viewpoint and his own in regard to these tumors, either in their method of formation or their occurrence. A fully mature muscle cell was not likely to become anaplastic. His effort this evening had been the legitimate one of bringing about some more reliable method of classification of these tumors in the place of the present very confusing and irregular method. It was perfectly true that the terms now used by the various authors, often meant different things and there was a great deal of confusion and misconception among them all in the use of their terms. He was aware of the result of the Brussels conference and was disappointed, because he had been in hopes that something useful might have come out of it. He did not expect to go beyond suggesting the term of "semimalignant tumors," which seemed to him a rational description and a very desirable term to use. It had a definite meaning and distinguished fully mature and immature cells. He thought, if the term of semimalignancy was approved, it would be a gain, also not to use the bulky term of myoblastosarcoma, and also to get rid of the term sarcoma, because they could very well use that for the tumors which were completely undifferentiated.

Doctor Goodale misunderstood the reference to connective tissue in myomata. The statement was that young myomata had no connective tissue but that this grew in secondarily.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OBSTETRICS AND GYNECOLOGY.

Meeting of November 24, 1914.

ASA B. DAVIS, M. D., *in the Chair.*

DR. ALFRED M. HELLMAN read a preliminary report of

A NEW METHOD OF PAINLESS CHILDBIRTH.*

DR. CHARLES C. LIEB read a paper on

THE PHYSIOLOGY AND PHARMACOLOGY OF THE EXCISED HUMAN UTERUS.†

DISCUSSION.

DR. JOHN O. POLAK of Brooklyn said that such a paper as that presented by Dr. Lieb should not go without some discussion. It was a very valuable contribution in correcting erroneous conceptions of the action of drugs. He had been impressed by the diagram showing the effect of pituitrin on the uterine muscle and could not see if that showed the physiological action, why they should continue to use it to check hemorrhage. Professor Fabre of Lyon had done some work along these lines in the study of the effect of certain drugs on uterine contractions in the pregnant state which was very similar to this. It was very interesting to see the force, and especially the very high force of the contractions. Such work could not help being of the greatest advantage; it gave much valuable information and pointed the way to a much more intelligent use of drugs in the treatment of pathological uterine conditions.

SPECIAL DISCUSSION WITH REFERENCE TO "TWILIGHT SLEEP" BY THE REQUEST OF THE COMMITTEE ON PUBLIC HEALTH, HOSPITALS AND BUDGET OF THE ACADEMY FOR A FORMAL EXPRESSION ON THIS SUBJECT.

DR. GEORGE L. BRODHEAD.—We have been using the method of Siegel at the Harlem and Post-Graduate Hospitals since last August. There have been forty-two cases at the Harlem Hospital in the service of Dr. Stein and myself. Of these, thirty-one patients

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[*] For original article see page 249.
[†] For original article see page 209.

showed good results both as to analgesia and amnesia; in eight cases the results were fair, and in three there were no results. There were eight operative cases, of which one was for hydrocephalus following version, six were forceps operations and one a breech extraction. There were no complications affecting the mothers. Thirty of the babies cried immediately after birth; eleven cried after some manipulation. Several babies required hot and cold baths, artificial respiration, etc. (Since the date of the meeting we have had our forty-sixth case at the Harlem Hospital and it is one of great interest. The woman was a primipara, and when the first dose was administered, the cervix admitted two fingers. Four hours later the child was born spontaneously, deeply narcotized. Three doses only had been given, the labor was short, the cord not around the neck, yet more than one hour was required to stimulate the respiration so that the child breathed fairly well. Ten hours after birth, examination of the eyes showed hemorrhage in both anterior chambers, with marked congestion of the iris. Dr. Cohen, the consulting ophthalmologist, described the condition as bilateral venous hyperemia of the retinal and conjunctival vessels. Thirty-two hours after birth the child died, the respiratory center having been profoundly disturbed for hours preceding death. Autopsy showed venous engorgement of the brain, and all the viscera, but the cause of death was undetermined. The use of twilight anesthesia was, in our opinion, undoubtedly the cause of death in this case.) At the Post-Graduate Hospital there have been twenty cases since the middle of August, of which ten were in the service of Dr. Knipe. Two babies in the series were stillborn, and one infant died thirty hours after birth. In one of these fatal cases, the cervix was dilated one finger at 4.30 P.M. and the heart was strong and regular as late as 6 P.M.; at 6.30 P.M. the heart could not be heard, and a stillborn child was quickly extracted with forceps. There was a partial prolapse of the cord between the head and shoulders. Only two doses of scopolamin and one of narcophen had been given, and the stillbirth may have been due, not to the "twilight sleep," but to pressure on the cord. There was no autopsy. In the second case labor began in the morning early, and at 3 P.M. when the cervix was dilated two fingers, the first dose was given. At 5.15 P.M., when the patient was almost in the second stage of labor, the third dose was given. The fetal heart varied between 140–160, but at 7 P.M. was of good quality. At 7.30 P.M. the heart could not be heard and the child was quickly extracted, the operation requiring but a few minutes. The child weighed 6 1/2 pounds and was in deep narcosis, and it required one hour and a quarter to make it breathe. The baby did not cry until hours afterward. Several times during the night the child had to be spanked to arouse it. The cord was loosely wound around the neck once, and I do not believe the position of the cord was responsible for the condition of the child. At 7.10 P.M. pituitary extract was given, with negative results. The child acted as if it had been drugged, and there was hemorrhage in each anterior chamber of the eye, possibly of toxic origin. Thirty hours after birth the child died, and autopsy revealed nothing of interest, except that there were no signs of asphyxia. This death also was probably caused by scopolamin anesthesia. The third case occurred in the service of Dr. Knipe. During the five hours prior to the time of delivery, the patient received four doses of scopolamin, and one dose of morphine. Two doses of 1 c.c. each of pituitary extract were given, and the child was born spontaneously. The cord was around the neck twice, and the child was stillborn, the heart beating for twenty minutes. Vigorous attempts at artificial respiration failed to make the child breathe. The autopsy revealed nothing of interest, except the absence of signs of asphyxia. The cause of death was undetermined.

The employment of the "twilight sleep" should be limited to patients in the hospital unless the obstetrician can be present constantly at the bedside, with the assistance of an efficient nurse, and he should be prepared to extract the child quickly if necessary. As the patient may not show characteristic second-stage pains, it is necessary to make more frequent examinations in order to ascertain whether the patient is in the second stage, and it is probable that forceps will have to be used more often, but in our service the extraction has usually been easy with a low application of the forceps.

DR. FRANKLIN A. DORMAN.—It does not seem fair for me to rise to this invitation as my experience has been limited to the observation of a few cases at the Sloane Maternity. However, I have been impressed by the fact that the women do better during the first stage of labor under this method of narcosis. Our cases were primiparæ. The patients behaved very much as they ordinarily do during the first stage of labor except that the pains seem to be stronger and the patients passed through this stage more rapidly. The second stage of labor is undoubtedly protracted and, indeed, there was uncertainty as to the time of its beginning. My observations have been limited to less than twenty cases and following these with an open mind it appeared that in occasional selected cases the method might be employed with advantage. If there is desire for relief from pain in a long tedious labor with strong pains associated with a rigid cervix which would leave the woman prostrated and shocked and might ultimately be a forceps case, this method seems to be indicated. It should be borne in mind that this treatment should only be employed in a hospital. That it is applicable to every case or to many cases I do not believe. We should go further in the study of the question of the amount of drug and the problem of the protracted second stage, and the occasional delirium, and we should have a frank statement as to the degree of asphyxia encountered.

DR. ROSS MCPHERSON.—It seems to me that this question is twofold. It concerns first the attitude of the physician. The articles printed in the public press have been most unfortunate and have been overdrawn in every possible way. With reference to the physician, it is his duty to point out to the patient that there is no panacea for the pains of childbirth and that this method of relief is one that cannot be employed in every case, and that, furthermore, it requires dexterity and experience on the part of the physician who attempts to use it. We have not seen any definite amount of asphyxia or postpartum hemorrhage from the use of these drugs, and to always attribute a case of asphyxia definitely to the drugs is in no way fair. Dr. Brodhead reported a case which seemed to be the effect of the drugs, but we have not seen such cases. He spoke of the difficulty of telling when a woman went into the second stage of labor, but, in my opinion, one need not worry as to just when the second stage of labor begins. The important point is the progress of the descent. Undoubtedly the second stage of labor is somewhat prolonged and there may be on this account a slight increase in the danger to the child unless the case is in skilled hands. It seems to me some of the men are giving too much morphine, and if the morphine is given too near the end of labor we are apt to get asphyxia in the baby. The scopolamine has not so much to do with the asphyxia but rather the giving of too much morphine.

Dr. James A. Harrar.—In October I reported on 100 cases of scopolamine narcosis and I shall not go into detail concerning those now. Since then on both divisions of the Lying-In Hospital I have had under my observation thirty-six additional cases, all of which I have observed at some time during their labor, and many of which I have watched delivered. We use the technic of Gauss, and only give the morphine or narcophen with the first dose of scopolamine. The repeats are scopolamine alone. The first dosage is very minute, chiefly a two-hundredth or a four-hundredth of the scopolamine. In twenty-eight of these thirty-six cases the amnesia was perfect and the women remembered nothing of their labor after the second or third injection. In five there was no amnesia, but distinct analgesia; in eight there was neither analgesia nor amnesia. There were six low forceps deliveries, one low median, and one high median forceps. There were two cases of moderately profuse postpartum hemorrhage in this series, both controlled, however, without the use of packing. Primary inertia was a distinct contraindication to the treatment. In one case in which there had been irregular pains for twenty-four hours we instituted the treatment when the pains became strong and regular, only to find after two injections a total cessation of contractions and were compelled to abandon the treatment. There were no stillbirths. There was one instance of severe asphyxia and two of mild asphyxia that were revived with spanking and tubs. Most of the children cried as quickly as in normal cases. If this series of thirty-six cases was compared with thirty-six ordinary deliveries of primiparæ in which no attempt at narcosis was made, it would be found that there were no more cases of asphyxia or other untoward complications than normal. In my first series of 100 primiparæ delivered under scopolamine seminarcosis there were two stillbirths. In one the short cord wound three times around the neck had to be cut before the shoulders could be delivered. The skin was covered with hemorrhagic petechiæ as were also the meninges and coverings of the internal organs, which the pathologists state are characteristic of fetal death from asphyxia. In this case I feel that the fatality would have occurred under any circumstances, whether the drugs had been used or not. In the second stillbirth delivery was effected with a median forceps due to dystocia, and whether this death of the fetus was due to the drug or not is impossible to say. Unquestionably the first stage of labor is shortened and the second stage somewhat prolonged. There is a frequent delay of the head on the perineum and one resorts to forceps quicker than he would otherwise because he does not wish to take any chances as far as the baby is concerned with this new method. We use pituitrin some, but prefer not to do so unless prepared to go on with forceps should labor not promptly terminate. One of the most important things for our consideration is what to tell a patient when she comes to you and wants the "twilight sleep." We must inform her that it cannot be used in every case and that the confinement must be conducted in a hospital. We must admit that there is a little increased danger to the baby, but not much if the fetal heart is carefully watched. I can say that in my experience the percentage of still births has not been increased, but that there has been more apprehension, we might say more scares. If the fetal heart varies between such limits as 120 and 160 it would be best to stop the treatment in a given case. It is especially important to watch the fetal heart every ten or fifteen minutes as the head comes down low on the perineum. Another disadvantage of the treatment is the extreme restlessness that occurs in a large proportion of cases, especially when the head is on the perineum. It sometimes requires several nurses to manage the patient in order to maintain any kind of asepsis, and these are not available in a private house. This restlessness is best controlled by a small amount of ether. This restlessness and the delay of the head on the perineum, resulting in a certain number of asphyxiated babies if not carefully watched, are the chief disadvantages of the method we have observed. With care these disadvantages should easily be under our control.

DR. JOHN O. POLAK, Brooklyn.—Dr. Beach, Dr. Holden, and myself have been using this method at the Jewish, Methodist, and Long Island College Hospitals. We have had sixty-two cases up to the present time without any mortality either fetal or maternal. There were three children mildly asphyxiated but the remaining fifty-nine cried without the use of any artificial means. It is noteworthy that these three were all private patients and the asphyxia seemed to be due to the cause to which Dr. McPherson has just called attention, namely, using too much morphine at the beginning of the second stage. If we use a minute dose of morphine and more minute doses of scopolamin at intervals, using the condition of the patient as a guide to the dosage we get excellent results. In my opinion this method of seminarcosis has a definite place in labor.

I had a woman with a decompensated heart, rales at the base of both lungs, mitral stenosis, and mitral regurgitation, who had considerable cyanosis after a dose of morphine of 1/8 grain and after a second dose and an ampule of scopolamin she was able to assume the recumbent position. An hour after she had one-half an ampule of scopolamin and she went through labor nicely. It is sometimes magical the way this method of semi-narcosis acts; it can be used satisfactorily in some cases of tuberculosis and it should be given a fair trial. We have been using it in every case in which it was possible to use it to see if it was good and have used it in two cases of tuberculosis with considerable involvement. In a case of toxemia of pregnancy we used the "twilight sleep" and also used colonic irrigations. It is hardly possible to appreciate the effect of this method on the dilatation of the cervix during the first stage of labor. It has been my fortune to make demonstrations before my classes of the cervices dilated under the relaxing effect of these drugs. We have exposed the cervices of primiparæ after the "twilight sleep" has been used and they are round and not slits. They are ecchymotic and traumatized but they do not show the lacerations that one usually finds. One woman was carried along in "twilight sleep" for eleven hours in a dry labor and the cervix was not notched at any point. We have had no hemorrhages; these are not the fault of the patient, but are rather due to the accoucheur, as for instance, when he attempts to deliver the placenta at the wrong time before it is separated. I agree with Dr. McPherson that we must follow the progress of our case closely by abdominal and rectal palpation. One should make a first examination per vagina and then follow that with the abdominal and rectal examinations to watch the progress of labor. One should observe the descent with reference to the relation of the shoulder to the median line and the progress of the head. As soon as the head comes to the pelvic floor these cases can be helped by flexing the thighs on the abdomen. In our sixty-two cases there were three low forceps operations. If one uses the same care in the twilight cases as we should use in others one gets as good results. I feel confident that the "twilight sleep" has saved for us two babies in the last twenty-four hours because of our routine and frequent examinations of the fetal heart. One was a case of coiling of the cord about the neck; in the second case there was a spastic uterus and interference with the utero-placental circulation. Complete surgical anesthesia obtained relaxation, and the heart regained its normal rate and rhythm. "Twilight sleep" has a definite place in obstetrics. It has its dangers; it is not "fool proof" any more than ether or nitrous oxide gas, but used intelligently and adapted to the condition of the individual case it has a definite place.

Dr. Ralph M. Beach, Brooklyn.—My observations comprise about fifty cases and about 70 per cent. of these were primiparæ. A perfect amnesia was obtained in 84 per cent. of the cases; partial amnesia in 10 per cent., and there were 6 per cent. of failures. In this series of cases we had as good results as in a similar series without the "twilight sleep" so far as forceps operations were concerned.

We used the typical Gauss method and treated each individual case according to the indications in that case. We found that we got better results by using one dose of morphine and then successive small doses of scopolamin. In the last fifteen or twenty cases the babies were delivered quickly. At the present time we have no fear of asphyxia and no longer keep the oxygen tank in readiness. If the morphine is not repeated and the scopolamin is given in 1/400-grain doses there seems to be no danger and we have fewer forceps cases than before we used this method. As to the delay in the second stage of labor, this may be obviated by flexion of the thighs on the abdomen, the application of a tight binder, and pituitrin when the head is on the perineum. The obstetrician should make an effort to help the woman just as he does in a normal case of labor and should not wait for the head to drop out, but should take the woman's hands and urge her to bear down. Where there is a rigid perineum a median episiotomy should be performed.

The "twilight sleep" involves the question of individualization in each case and it is this adaptation of the dosage to the conditions of each individual case that means success, and determines whether the baby will be asphyxiated or not.

Dr. Frederick C. Holden.—My experience is quite similar to that of Dr. Beach. At the Methodist Hospital we have had thirty-five cases in which the "twilight sleep" has been used. Our success is largely due to a very bright house physician who is greatly interested in this subject. We have had no maternal or fetal mortality. We had rather a curious experience recently. We had a patient whom the house physician decided was not a proper case for the twilight sleep though he did not formulate any definite reasons for his belief. This patient had two chloroform anesthesias and after delivery developed cerebral symptoms and died either from cerebral or liver affection. It was most fortunate that they did not give her the "twilight sleep" for had they done so and the outcome had been fatal the "twilight sleep" would have been blamed. I would emphasize the necessity for watchfulness during the second stage of labor. I believe a median episiotomy should be done when the head is on the perineum.

Dr. Abraham J. Rongy.—This is a method which has known indications and also limitations. My experience embraces 240 cases and 50 cases at the Lebanon Hospital. The "twilight sleep" has its place in prolonged labor in both primiparæ and multiparæ, but it has no place in short labors. It seems to me it is a question of analgesia and not of amnesia. From the standpoint of the woman amnesia seems desirable but from the standpoint of the physician analgesia is desirable. I have known a woman to have thorough amnesia and yet scream and appear to be in great pain. All seem to agree that the twilight sleep shortens the first stage and prolongs the second stage of labor. It saves probably two, three, or four hours. As far as the effect on the baby is concerned, we had about 15 per cent. born with oilgnopnea. I do not agree that the morphine produces the oilgnopnea, because we used morphine before we used this method and did not find that it had such an effect. The appearance of the child is not that of a true asphyxia but rather a livid paleness and in my opinion it is due to the scopolamine and to nothing else. We did not repeat the dose of morphine and still had 15 per cent. of olignopnea in our series and it was due to the depressed condition of the respiratory centers caused by the scopolamine and not to the morphine. We had seven or eight babies die within the first twenty-four hours, but in only two cases could the death be attributed to scopolamine. We had no postpartum hemorrhages. We used the method in four cardiac cases. It is an ideal treatment in cardiac conditions as themental and physical strain are removed and the patient goes through to the second stage and then she ought to be dilated anyway as these cases should not go through a prolonged labor. The question of postpartum psychosis must be touched upon. In Buffalo at the recent meeting of the American Association of Obstetricians and Gynecologists two cases of serious postpartum phychosis were reported in which the twilight sleep was used and two in which it was not used. If the twilight sleep had been used in the latter cases it would have been blamed for the terrible result. Still in highly strung neurotic women the twilight sleep is good. When one studies the action of scopolamine one questions whether it may not have an effect on the brain cells. We must guide the public correctly with regard to their misconception and point out that with the twilight sleep we may have a lessened amount of pain and perhaps obtain amnesia; and that it should be employed particularly in those cases in which labor promises to be tedious and prolonged.

Dr. Samuel W. Bandler.—I question the advantage of this method, which even when successfully carried out merely saves the mother the recollection of some pain, a method which possesses danger for the baby. Why therefore should we use it? When patients come to me asking for the "twilight sleep" and inquiring whether they should have it, I tell them that they may have "twilight sleep" but that the labor will last longer than usual, that there will be an increased amount of risk to the baby and that the chances of having to use forceps are decidedly increased. When patients hear this not one makes any further demand for the method. If on the other hand a patient is told that instead of "twilight sleep" a drug which increases the efficacy of the pains can be used (pituitary extract), that there will be an increase in the amount of pain, but that the labor will be shorter, that the chances of having to use forceps will be markedly lessened and that there will be less danger for the baby, patients, without any exception, assent to this method, even when put before them in this frank way. Why then use "twilight sleep?" One important disadvantage of morphine and scopolamine is that, if we do desire to use pituitary extract, and desire to have the advantages which its use possesses, in very many instances the injected morphine and scopolamine inhibits the action of the pituitary extract and forceps, instead of being avoided, are needed more frequently than usual.

It has been said by one of the speakers that the "twilight sleep" method worked beautifully in a case of cardiac dyspnea and that the patient's dyspnea and discomfort was relieved after two or three injections and that thereafter the patient's comfort was markedly increased during the progress of the labor. We all recognize the value of morphine in cardiac difficulties. It is one of the best cardiac stimulants we know and surely when combined with atropine is one of the best sedatives in cardiac dyspnea. We have all used it and we all use it in such cases, and one need not call this well-recognized line of treatment "twilight sleep." It has also been said that in a case of toxemia of pregnancy the "twilight" method so quieted the patient that the various methods of treatment instituted were well borne by the patient. It is quite out of place to refer to this method of treatment in toxemia of pregnancy as "twilight sleep" for here again the use of morphine and atropine has been one of the finest supports we medical men have had. Hence we should in these instances speak of the use of morphine and atropine or morphine and hyoscine as medical therapeutic agents long since recognized to be of tremendous value. To call these therapeutic agents "twilight sleep" is a mistake which may do much harm.

Dr. Sidney D. Jacobson.—It is refreshing and instructive to hear some of the gentlemen this evening. However, it is peculiar that in all the mass of literature in the medical as well as the lay press advertising "twilight sleep" no mention is made of the fact that a general anesthetic, such as ethyl chloride or ether, has to be administered to the twilight patient while the head and body of the child are being actually born. This is done in practically all cases inside and outside of hospitals. Inasmuch as precisely at this time of labor the really severe labor pains are present, it proves that "twilight sleep," as such and unaided, is not sufficient to bring about a really painless labor. This evening also I noticed that the gentlemen who lauded "twilight sleep" carefully avoided mentioning this trifling fact of the necessity of a general anesthetic before the completion of labor. Some of its advocates admit that this method does not make a painless labor but claim that at least there is less pain than usually felt by the patient. Personally I have had some experience with this method and when I recall seeing some patients in a certain hospital and elsewhere screaming and trying to get out of bed, being controlled only with difficulty by the hands of some attendant, it strikes me that the pain they suffered could not have been very slight. In these cases the treatment was not administered by a beginner, but by one thoroughly experienced in handling "twilight" cases.

Scopolamine acts like alcohol in certain ways; it confuses the patient's mind and affects her memory. I remember many years ago delivering a woman who was intoxicated with whiskey and in her "twilight sleep" the baby was born. She also did not remember having had any pain during childbirth. Instead of being stupefied by scopolamine she was only drunk and stupefied with alcohol. Scopolamine drugging reduces the efficiency of labor pains and prolongs labor. To offset this effect pituitrin has usually to be injected to strengthen and increase the labor pains. It also increases the noise which the patient makes. Inasmuch as the administration of "twilight sleep" is still for the most part in the hands of the elect and expert it must be assumed that pituitrin is necessary for the satisfactory delivery of the patient, and this fact proves that scopolamine weakens labor pains and makes them less efficient.

I do not believe that it is the scopolamine that asphyxiates babies but that this is due to the ofttimes necessary doses of pituitary extract. When a baby is born in "twilight sleep" and is not quite asphyxiated, but only breathes very slowly and in such a manner that it causes the medical and other attendants a few anxious moments or hours, we are told it is suffering from olignopnea. This word which sounds terribly scientific was used here tonight by a number of speakers. It has also appeared lately in some medical publications on "twilight sleep." Olignopnea is a satisfying mouthful and is guaranteed to make an impression on any audience. There is a perfect epidemic of this word now. I must confess to having introduced it in this country while translating an article on "twilight sleep" of a German confrère into English, and now it has become to me a veritable Frankenstein. I have pleaded guilty.

DR. EPHRIAM K. BROWD.—I would like to see the "twilight sleep" used in cases of cardiac disease, tuberculosis, emphysema, neurasthenia, and different neuroses, and where it is really dangerous for the woman to go through labor. I would like to see it used in those cases in which one cannot give an anesthetic. I recall one cardiac case in which the patient nearly died bearing down and straining. In all such cases the "twilight sleep" would prove a most welcome help.

DR. MALCOLM MCLEAN.—A close study and observation of the "twilight sleep" since the scopolamine-morphine treatment was introduced nine or ten years ago, together with the reports of those who favor it, has convinced me that it is mischievous, materially, to mother and child, and morally, by its presentation to the public. For these reasons I wish to go on record as unalterably opposed to its use in obstetrics.

DR. SAMUEL JEROME DRUSKIN.—In taking account of all the statements made here tonight it seems that we have been using this method since November, 1912, and after figuring up all the cases find they cover about 300 cases. Someone implied that it was necessary to anesthetize the patient in order to get a successful twilight sleep. It is not necessary to give a general anesthetic. When we begin to give the treatment early no inhalation anesthesia is needed except when operation becomes necessary. During the primary stage the patient may be aroused out of her slumber and she will remember; the patient should then be studied and the amount of the dose regulated so as to obtain a successful twilight sleep without the use of inhalation anesthesia. The restlessness which has been referred to as being a disadvantage in the use of this method occurs in a very small percentage of cases, perhaps about 3 per cent. There is a certain amount of tossing about, but no tearing of hair or serious disturbance. Dr. Polak made the statement that hemorrhage was due to the way in which the third stage of labor was conducted and I have said that the same care is necessary in the conduct of a case of anesthesia or of "twilight sleep." One must watch the mother carefully and also the fetal heart and this makes some more work for the doctor and for the nurses; twilight anesthesia certainly does not lessen the work of conducting a labor. As to the question of amnesia and analgesia, I am certain the analgesia is not complete and the question then comes up whether it is worth while simply for the sake of forgetfulness to go through all this trouble. I say "Yes." Dr. Crile emphasizes the effect of anxiety and loss of sleep on the brain cells. There is less harm from the scopolamine than from the effects of the anxiety and loss of sleep. The patient during the first stage sleeps between pains, and the relief from the consciousness of pain saves her from exhaustion. This is certainly a gain. As to the question of pituitrin—pituitrin is not a toxic drug, it affects the uterus. Its action on the uterus may be excessive and there may be dangerous results, but when we give pituitrin and the uterus does not respond, we should be careful to give only enough to cause an increased tonus of the uterus.

Dr. ——————————.—In listening to this discussion my conclusion was that all who had used the "twilight sleep" found it successful, those that had not used it found it unsuccessful. If a patient comes to me and asks for the twilight sleep I would tell her that in 80 per cent. of 200 cases there was partial or complete analgesia and amnesia in all of the 80 per cent., while on the following day she remembered nothing about it. I would not tell her the baby would die but I would tell her there was some danger to the baby and of course she would refuse the treatment.

I agree with Dr. McPherson and Dr. Harrar that the first stage of labor is shortened and the second prolonged, but that it could also be shortened by the use of pituitrin. As to scopolamine and morphine being antidotes to pituitrin I would say that I have given the pituitrin and so far its action has not been counteracted by the scopolamine. The prolongation of the second stage may be shortened by pituitrin, that is, if the forceps are ready for use for one cannot tell to what extent the uterus will contract. One cannot give a drug that it takes two hours to take effect in cases in which the labor will be a short one, but it is applicable in either multiparæ or primiparæ where the labor is prolonged with the exception of primary inertia, and patients are entitled to it, and should know the truth. We must also judge the woman; some women will react differently than others. Some will scream and raise a great disturbance while others will bear pain much better under normal conditions and the same is true of the "twilight sleep." In some instances the woman may scream but does not apprehend the pain even though she has it; she forgets it and will say afterward that she has had no pain. As labor progresses she anticipates the oncoming pain and magnifies it; this is not due to the increased pressure but to the fact that the woman anticipates the oncoming pain and reacts to it. The intervals of pain are not prolonged by the "twilight sleep," but the patient does not apprehend the oncoming pain and does not react before the pain has actually begun. While I agree with those who advise caution in the use of this method, I believe it has a place in labor in suitable cases.

DR. ALFRED M. HELLMAN.—We have given the "twilight sleep" in forty cases at the Lebanon Hospital. This is a very small proportion of the number of cases that came in. We took only normal cases at first where no complications were expected and we had no fetal mortality. We now feel that the method is safe and give it to every case with the object in view of investigating the results under all conditions. Of twenty-five cases to-day in our obstetrical ward there was one eclampsia and one Cesarean section. There were sixteen cases of "twilight" among them and among these there was one case of twins, one version and two forceps. There were no perineal tears, no olignopneas, and the puerperium was normal. The case of version died and so did one of the twins. In thirteen of these cases the amnesia was absolute, in one partial and there were two failures.

A MEMBER then presented the following resolution:

Resolved; that the Section on Obstetrics and Gynecology of the New York Academy of Medicine after a full discussion concludes that "twilight sleep" (Dämmerschlaf) is a recognized and valuable method of treatment in selected cases of labor requiring proper surroundings and continuous medical attention.

DR. A. ERNEST GALLANT.—I would like to ask whether the Public Health Committee proposes to take this discussion and to make use of it, or what is to be done with it. It could be put in some concrete form and made use of, possibly in the medical press. I cannot agree that the Section as a whole should endorse the resolution that has been presented; to take such a step before we have reached more definite conclusions would be unwise. The discussion should be used for the benefit of the profession, but it is too soon to commit ourselves definitely on this subject.

DR. GEORGE W. KOSMAK.—I recently received a letter from the Committee of the Academy of Medicine previously referred to, expressing a desire to obtain an official, sensible opinion from the Section on Obstetrics and Gynecology in regard to the value of the "Twilight Sleep", which would enable them to some extent at least to meet the more or less exaggerated accounts that have found their way into the public press. The medical literature has but little on this subject in this country, beyond the publication of the method of Gauss and Krönig. For these reasons and because of the many inquiries as to the value of this method the Committee on Public Health is entitled to obtain a concrete opinion.

The Section would be unfortunate to make public a resolution of this kind. The status of twilight sleep is in much the same position as the war situation in Europe; it is difficult to remain neutral, but notwithstanding the temptation to be influenced on one side or the other we ought not to express ourselves either for or against the "twilight sleep" at the present time. I do not believe that the discussions of the men are sufficiently in accord to make it advisable for the Section to place itself on record as endorsing the resolution at this time. We are not in a position to inform, the public is not itself in a position to judge what is good and what is bad for it. The interest of the laity is greater now than it ever has been in medical matters, but at the same time the quack and the irregular practitioner are also in greater force and greater popularity than ever before. Are we going to give these men an additional opportunity to take advantage of the laity? Suppose we let this discussion go to the medical press and to the medical press only as an expression of what this Section thinks at the present time. It seems to me that this would be better than the adoption of a formal resolution.

A MEMBER.—I did not understand that we were to give out this resolution to the laity or to the press. If I thought it was not to go as a private opinion I would wish to withdraw it, but when we are asked to give an opinion to the Academy I think we should give one or say that we are unable to give it. If this resolution is to become public I withdraw it.

DR. ROSS MCPHERSON.—I would deprecate any resolution such as has been presented and I agree with Dr. Kosmak that we have had too few cases and too little unanimity of opinion to warrant the Section expressing itself in such a positive way. In my opinion we should give further attention to the subject before committing ourselves to a definite statement.

DR. SIDNEY D. JACOBSON.—As a substitute for the resolution which had been withdrawn I would suggest that the opinion of those who have spoken this evening be presented to the Committee on Public Health, Hospital, and Budget of the Academy by the Chairman of this meeting.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Pregnancy after Myomectomy.—Goullioud (*Ann. de gyn. et d'obst.*, June, 1914) tells us that surgeons may be divided into two groups with regard to the treatment of myoma uteri, the partisans of hysterectomy and of myomectomy. The partisans of hysterectomy think that the operation of myomectomy is incomplete and exposes to recurrence and secondary operations. They believe it to be graver, exposing to infection, and with more difficult hemostasis. They object that the pregnancies are so rare as to be negligible after myomectomy. The myomectomists believe that we should preserve to the patient her feminine sexual attributes, and her hopes of marriage and child-bearing, especially in young women. Often the causes which have produced myoma have already rendered the woman sterile; Benoit-Gonin has collected ninety-nine cases of pregnancy after myomectomy. The author gives the histories of five additional cases on which he has operated. Out of 648 operations by the author there have been seventy-four of myomectomy against 574 of hysterectomy. Of the seventy-four myomectonies five have become pregnant, that is, 8 per cent. Of the seventy-four myomectomies thirty-four were unmarried, forty were married; that is 12 per cent. became pregnant. Of the forty there were fourteen past the usual age of child-bearing. Thus the rarity of pregnancy appears not to be so great as is generally supposed. Twenty per cent. of the married women at the child-bearing age were pregnant. Nystrom had twenty-seven cases of pregnancy out of 207 myomectomies. We should study the effect on fecundity of the position and size of the fibroma. The abortions are only 20 per cent. of the pregnancies. Döderlein has had one rupture of the uterus after pregnancy. Histories of the author's five cases are given. The conclusion is that after long observation of his operative cases the author believes his results to have been satisfactory, recurrences rare, and pregnancies sufficiently frequent to justify the operation.

Treatment of Puerperal Eclampsia by Morphine and its Adjuvants.—Jules Rouvier (*Ann. de gyn. et d'obst.*, June, 1914) says that there is an important difference between eclampsia of azotemic origin and true uremia. True uremia results from an irreparable kidney lesion, while the functional nature of the causes of the other condition limit the duration of the kidney inhibition. A proper prophylactic treatment generally places the patient out of danger, but the milk diet does not always prevent convulsions. The author gives histories of twelve cases observed by him. Here there are grave blood changes produced by means of unusual constituents of the blood, such as lipoids, enzymes, ferments, proteid materials and hemolysins. At the same time the glands of internal secretion have a marked influence on eclampsia. From poisons and their secondary products arises a state of toxemia. In the prodromal period there are increased arterial tension and albuminuria. The hypertension varies very greatly in different cases; it may remain absent during the crises, it may be slightly elevated. In spite of a normal tension death may occur. Cases with great rise of tension may nevertheless recover under suitable treatment. The chance of cure is not lessened by high tension. The secretion of the suprarenals may be greatly influenced by pregnancy. All accoucheurs know of hypotension occurring with incoercible vomiting, and the good effects of the administration of adrenalin. Hypersecretion of the suprarenals causes immediate rise of arterial tension. In eclamptics we may admit a hyperactivity of the adrenals. This may be caused by intoxications or by the exaggerated reaction of the suprarenals against the exogenous or endogenous poisons characterized by suprarenal hyperplasia. In these cases of eclampsia there are high tension, congestion, and edema of the brain and lungs. In other cases the suprarenal will function at less than is normal, and the tension will be lower. Eclampsia may occur without albuminuria, or the latter may first appear after the convulsions have ceased. The intoxication lowers the powers of the organs of defense, and the endocrinian glands participate in this effect. A rapid destruction of the hepatic cells throws into the circulation secondary poisons that assist in causing convulsions. The hepatic lesions are increased by the administration of chloroform. The convulsions themselves cause passive congestion, and the patient may die from asphyxia during the crisis or by lesions of the organs following them. The precocious lesions occur in the liver, kidneys, and organs of digestion. Hemorrhages are found in the liver, spleen, pancreas, and meninges. The capillary walls in large hemorrhages are altered frequently by previous specific disease. But eclampsia occurs in young, generally healthy subjects. From this conception of the eclamptic condition thus elaborated the author derives his treatment of eclampsia by means of morphine and its adjuvants. His results in twenty-nine cases treated have been most encouraging. Only two who came in moribund had a fatal issue. He believes that large doses of morphine are necessary. First he gives 2 centigrams, after half an hour another centigram, and a fourth a half hour later if the crises have not moderated. If they cease after two hours he waits another two hours before giving another centigram. The action of the morphine is diuretic because it diminishes the vasoconstriction of the renal capillaries. The albumin lessens. As adjuvants of the morphine the author ranks lavage of the stomach, water diet, lavage of the intestines, and helmitol. All assist in increasing the eliminations of the poisons contained in the blood. This treatment is rational and effective. In threatened asphyxia he gives oxygen inhalations. A guide to the severity of the congestion may be the color of the cerebrospinal fluid. If it be bloody the prognosis is bad. Persistent coma and Cheyne-Stokes respiration are bad symptoms The mental complications are relieved by morphine. The author believes that his method of treatment will lower the mortality of eclampsia and better its prognosis.

Use of Ether in Puerperal Infections.—E. Cabanes (*Bull. de la Soc. d'obst. et de gyn. de Paris*, June, 1914) substituted ether for peroxide of hydrogen for cleansing the purulent surfaces of the placental wound, erosions, cervical tears, etc. He believes that it is superior to peroxide of hydrogen for these purposes. In six cases he has used it in puerperal infection with marked success. It has no dangers or inconveniences.

Kidneys and Heart in Pregnancy.—V. J. McAllister (*Med. Press*, Nov. 25, 1914) states that heart or kidney lesions complicating pregnancy comparatively seldom prove fatal. Occurring together their association with pregnancy is usually extremely serious in its consequences. Pregnancy determines an increased cardiac activity.

The heart slowly hypertrophies to withstand the sudden strain of parturition. The gravest cardiac lesions in this connection are those affecting the cardiac musculature. Uncomplicated valvular lesions do not in the large majority of cases endanger either the pregnancy or the mother's life. Even successive pregnancies, if separated by an interval of some years, can be successfully passed through without aggravating the cardiac condition. In the case of muscular lesions a pregnancy may or may not have serious consequences. The recognition and proper appreciation of degenerative changes in the myocardium demand experience and careful observation in conjunction with repeated functional testing. Where the kidneys are diseased the behavior of the blood pressure is of great importance. Should it become markedly elevated the heart will have greatly increased work to perform. The acute form of pregnancy kidney is not usually associated with much increase in blood pressure. The slight elevation met with rapidly responds to treatment. The chronic form of pregnancy kidney is associated with a rise of blood pressure, which seldom exceeds 190 mm. of Hg. It is difficult, often impossible, to reduce the blood pressure in such to normal limits. Not improbably, to attempt to do so would be unwise. In some 6 per cent. to 8 per cent. of such cases eclampsia supervenes. A fatal termination is more often determined in eclampsia by the intense strain to which the convulsions subject the heart than to the action of any special toxin. It is often impossible to distinguish between a case of chronic pregnancy kidney and one where the symptoms are the sequence of pregnancy supervening in a patient already the subject of chronic nephritis. No sharp line of demarcation exists clinically or anatomically to separate one group from another. Cases of pregnancy kidney are met with in which treatment is unavailing in lowering the markedly raised blood pressure which has succeeded in attaining a level usually regarded as characteristic for chronic nephritis complicated by the patient becoming pregnant. Even an initially sound heart is liable to collapse when exposed for a number of weeks to a pressure within the circulatory system of 200 to 220 mm. of Hg. with the added strain of pregnancy. Postpartum, in the acute toxic cases, the blood pressure rapidly falls to normal limits. Where pregnancy supervenes in a patient whose kidneys are already chronically diseased, the blood pressure remains elevated postpartum.

Twilight Sleep.—At Long Island College Hospital J. O. Polak (*L. I. Med. Jour.*, 1914, viii, 455) has been using scopolamin and narkophen in all labors, unless the patient has refused the treatment, and has found that the patient should be definitely in labor; that is having appreciable uterine contractions, recurring at regular intervals, preferably every four or five minutes before the first injection is given. In multiparæ the initial dose may be given at the very beginning of labor. The woman should be in bed, in a well-ventilated, darkened room, removed from all noise or excitement. By this both amnesia and analgesia may be obtained with much smaller doses. Careful observation must be made and recorded of the pulse, respiration, condition of the pupils and the frequency and character of the uterine contraction. It is unnecessary to disturb the patient for memory tests, as observation will show how deeply she is under the influence of the drug. Ordinarily, the woman will give outward evidence of acute suffering during the pain, but will immediately lapse into a peaceful sleep at its cessation. She requires large quantities of water but no food throughout her labor. Water is best given just after the pains. The progress of labor must be constantly watched by repeated abdominal or rectal examinations. Frequent vaginal examination invites sepsis. Following the position of the shoulder as it rotates inward and descends is a good index of the progress of labor. The fetal heart must be listened to and recorded every half hour, both in the interval between and during the pains. Arythmia or slowing of the fetal pulse between pains is a bad prognostic sign and demands witholding the further use of the drugs and prompt delivery by the most suitable route and method. The solutions of the drugs must be absolutely pure. Hyoscine cannot be substituted for scopolamin, but narkophen is no better than morphine. The American preparations have produced delirium. The dosage differs in each individual case, and especially with the time of labor at which induction of the sleep is attempted. It is easier to induce sleep in a woman early in the first stage, than when she is near the end of her dilation stage. Intelligent employment of the method shortens the first stage; on the other hand it may prolong the second; this should be guarded against, and if the perineal stage lasts over an hour in multiparæ or two hours in primiparæ, delivery should be effected with the patient in the Schmitt posture, with extreme flexion of thighs on the abdomen, combined with expression of the fetus, or by low forceps. The third stage is not influenced by scopolamin or narkophen, and when properly used they do not predispose to postpartum hemorrhage. The placental stage should be managed so as to secure the separation and expulsion of the placenta, and retraction of the uterus by the normal process. This is done by clamping the cord close to the vulva and leaving the fundus absolutely alone. When separation occurs it is shown by a gush of blood from the vagina, expulsion of the cord and rising of the fundus; the hand is then placed on the fundus and the patient asked to bear down, when the placenta is delivered. Low forceps, perineotomy, and primary suture of pelvic floor injuries can be done without further anesthesia and will not be remembered by the patient. Scopolamin and narkophen come in ampules containing 1 c.c. Each ampule contains, respectively, scopolamin 0.0003 gram or gr. 1/200; narkophen, 0.03 gram or gr. 1/2. They are used as follows: if labor pains are definitely established, 1-1/2 ampules of each is given hypodermatically; forty-five minutes later, one ampule of scopolamin is administered alone; one hour later, half an ampule of each. This is followed every two hours or so by half an ampule of scopolamin alone. It is seldom necessary to repeat the narkophen, though it may be used every third time, at six-hour intervals in a long labor; of late the writer has omitted it after the first dose. It is the narkophen which has the bad effect on the child. Smaller doses are required when the sleep is induced early in labor, larger doses when the first stage is well advanced before the sleep is induced. It is in the latter class that there is most danger to the child, as the child gets the full effect of the drug. In the author's fifty-one cases there have been no failures. The patients have had no recollection of the labor. The children in all except two cases have shown no signs of asphyxia or cyanosis. One patient had a long second stage and the child inspired much mucus in passing through the vagina and required aspiration and mouth-to-mouth insufflation. There has been no postpartum hemorrhage; there have been two low forceps; the placenta was delivered without difficulty in all; none of the women have shown signs of tire or exhaustion the next day. Multiparæ have had some after-pains, which a full dose of ergot and a sitting posture quickly arrested. Many were allowed up on the fifth or sixth day, unless they had sustained severe perineal injury, and this has been minimized by the slow perineal stage. All have had much less nervous and muscular exhaustion than follows in the same class of patients in ordinary labor.

The objections to twilight sleep mentioned by O. P. Humpstone (*ibid.* 461) are the occasional occurrence of twilight delirium which interferes with the maintenance of strict asepsis; the lack of use of the voluntary muscles in the second stage, often prolonging that stage beyond the limits of safety; oligopnea of some of the babies and asphyxia of others, chiefly when the second stage has been allowed to last too long. The advantages are that it is possible to remove the most of the suffering in childbirth from about 85 per cent. of all cases. There is easier and prompter dilation of the cervix and this is more marked in dry labor. There is less muscular effort in the labor. Nervous shock is eliminated to the extent that these women feel and look much better than the ordinary case of labor, after the completion of their labor; predisposing to a more rapid and better involution. A larger percentage of these babies leave the hospital above their birth weight than after ordinary births, suggesting a better milk secretion. Less perineal tears occur because of the slow perineal dilation.

Treatment of Puerperal Sepsis.—In a conservative paper on puerperal sepsis S. J. Goodman (*Amer. Jour. Surg.*, 1914, xxviii, 459) says that the general practitioner is the man to prevent and also treat puerperal sepsis. It may be prevented by keeping the patient in good health and amid hygienic surroundings before labor, and by conducting the accouchment in an aseptic manner in a clean place. If you are unfortunate enough to have a patient infected, she is to be treated with cleanliness, fresh air, good nursing and brains. He outlines this combination as follows: 1. Absolute rest in bed, in a good hospital if possible, and with an intelligent nurse who is not afraid of work and who likes to look pleasant and cheerful all the time. 2. Plenty of warm fresh air and sunlight. 3. Patient in Fowler position. 4. Remove all stitches and swab wound with pure tincture of iodine. 5. Nutritious semisolid or fluid diet. Feed at least every four hours. Plenty of cold water to drink. 6. Take babe from the breast. The breasts may be kept in condition for nursing later by massage and pumping. 7. Tepid sponge baths every three or four hours, when the temperature is 102° or above, unless the patient objects. They seldom object. 8. A brisk cathartic at the beginning of the treatment; an occasional laxative to keep the bowels in good condition. 9. Salts, glycerine and turpentine enemas for the relief of gas pains. 10. Seeping enema, usually given for one and a half hours, discontinued for three hours and then repeated. 11. Cherry red iodine vaginal douches every four or six hours, given for the sole purpose of flushing out the vagina and keeping it free from débris, and not for any specific therapeutic purpose. 12. Aspirin, 20 grains every four hours; given at night if the patient is awake. 13. If the heart is arhythmic and beats more than one hundred and twenty times per minute and is of poor quality, 15 minims of digalen hypodermatically every three or four hours. 14. No visitors admitted except the family who are requested to have a cheerful expression when they call. The patient is assured that she will recover and she generally does under this treatment. Surgery, sera and specifics are of little or no avail.

GYNECOLOGY AND ABDOMINAL SURGERY.

Pruritus Vulvæ.—Eyraud-Dechaux (*Rev. de gyn.*, June, 1914) considers the subject of pruritus vulvæ as of importance not because it is dangerous to life, but because it may become so severe as to render life not worth living, and destroy the stability of the nervous system. It is often an indication of serious lesions of the genital organs or of a general disease, such as diabetes. In the immense majority of cases the lesions situated around a mucous orifice are the result of a lesion of the neighboring mucous membrane. In many cases we cannot find any lesion of the genital or perigenital region at all, and in these cases it results from a general disease. The first thing in the treatment of a pruritus is to ascertain its cause, and abate it. Under the head of general etiology the author mentions that certain races, as the Jewish, are especially subject to pruritus; some cases appear to have a hereditary factor. The crises are often brought about by the heat of the bed, by the congestion of the menstrual period. There is at first no lesion to be seen, but soon there are changes in the skin due to the irritation of scratching and the whole picture is transformed, the skin becoming thickened fissured, and crusted. There are several kinds of parasites that may cause pruritus, such as phthiriasis. Other cases are due to the use of medicinal substances or toilet articles applied to the vulva. Various kinds of intestinal worms may cause reflex irritation of the skin. Thrush is a cause in infants. Urethritis, vesical calculi, hemorrhoids, herpes, and vulvar syphilis are other causes. Vulvovaginitis, metritis, fibromata, cancer, and salpingitis, by irritating discharges may all cause agonizing pruritus vulvæ. Pregnancy is another cause. At the menopause it develops in arthritics. Leucoplakia again causes intense pruritus, and only removal of the patches will bring relief. Diabetes is the general disease that is most frequently a cause of pruritus, and there may not be any visible genital lesion. Treatment may be local of various kinds, washes, lotions, powders, etc. General hygiene, and feeding must be looked into; traumatisms and local affections studied and relieved. Various articles of diet must be interdicted, and the digestive tract put into the best condition. Nervous excitability may be moderated by valerian, etc. Hot water applications to the vulva are of use, and also hot air.

Of electrical applications that are of value the continued current, static bath, high-frequency current, and *x*-rays may be mentioned. Radium has relieved some subjects. Linear scarifications, superficial cauterizations, and incisions of the terminal nerves have done some good in severe cases. Most cases will yield to three methods of treatment wisely combined, general treatment, symptomatic treatment, and causal treatment.

The Ovaries in the Fibromatous.—De Jong (*Ann. de gyn. et d'obst.*, June, 1914) gives the results of the histological examination of the ovaries in thirteen cases of fibroma uteri and a study of the literature of the subject. The development of the ovary is very variable in these cases with reference to the number of atresic follicles and corpora lutea. The menstrual corpus luteum is inconstant in cases of fibroma; it may be double. These facts are not in accord with the theory that the ripe follicle ruptures twelve to fourteen days before menstruation. The author believes that there is no difference between the corpus luteum of fibromatous and of normal women. There can be no doubt that the ovaries have an effect on the uterine hemorrhages in fibroma. Cases of cure of hemorrhage after Hegar's operation demonstrate this. The author believes that it is in favor of the regulatory rôle of the ovary when we find a coincidence between two corpora lutea and the regularity of the hemorrhages, also a coincidence between the absence of a corpus luteum and irregularity of hemorrhage.

Hydrosalpinx and Hydrorrhea.—J. Mouchotte (*Rev. de gyn.*, June, 1914) says that a true hydrorrhea appears often as a symptom of fibroma uteri and certain lesions of the adnexa. He discusses the causes and mechanism of production of this fluid. In some cases there is a periodical increase in the size of the tumor, and after evacuation of a large amount of fluid the tumor becomes smaller. There seems to be a temporary occlusion of the lumen of the uterine canal, and by muscular action or the removal of some obstacle the retained fluid is allowed to flow away. The author believes that during the premenstrual congestion, with a uterus and tube the subjects of a certain amount of inflammation an extra amount of watery fluid is secreted by tube and uterus. With an active circulation, dilated capillaries, engorged with blood, and a serous transudation of the neighboring tissues, and a mucosa infiltrated and increased in thickness, and an increased number of glands we get a very abundant secretion. Ovulation increases all these factors, and thus is produced the hydrorrhea.

Transverse Cuneiform Excision of the Fundus Uteri.—L. Aubert (*Rev. de gyn.*, June, 1914) describes under the name of transverse cuneiform excision of the fundus uteri a conservative method of removal of diseased adnexa when it is desirable to preserve to a young woman a portion of her genital organs. By the use of this method instead of laparotomy and extirpation of the adnexa we preserve menstruation and the secretion of the ovary. While lesions of the genitals are usually bilateral there may be a portion of one ovary at least that is not diseased. Many of the women who have these lesions are under thirty years of age when they come into the hands of the operating gynecologists. To perform this operation a laparotomy is first done; after hemostasis, there is a transverse excision of the portion of the fundus connected with the diseased adnexa, which may be varied according as it is desired to remove only the tubes or one or the other ovary. After the excision the portion of the adnexa to be removed is extirpated. Peritonization with sero-serous parietal hysteropexy is performed and the abdomen closed. The round ligaments are avoided, and a uterus of considerably reduced mass remains, held in an anteflexed position. Menstruation occurs regularly. The pains and metritis are cured.

Operative Treatment of Uterine Cancer.—M. C. Waegeli (*Rev. de gyn.*, July, 1914) has summarized the operative results of the gynecological clinic of the University of Geneva, from 1890–1912, for uterine cancer. During this period 358 cases of uterine or vaginal cancer were admitted to the wards. Of these only 91 were considered operable. There were 8 amputations of the cervix, with no mortality, and 1 definite cure; 18 vaginal hysterectomies, with 2 deaths and 2 definite cures; 18 total vaginal hysterectomies, with 3 deaths and 3 definite cures; and 37 Wertheim operations, with 13 deaths and 7 definite cures. The Wertheim operations were done during the last nine years. It results from the author's observations that the recurrences take place within three years after the operations, and that after three years without recurrence we may consider a case of cancer of the cervix cured. In the early days of this operation it was preceded by a cauterization of the vaginal canal and curettage. Later it was considered better to pour iodine into the cervix through a speculum, allowing it to remain five minutes, and then evacuate it, after which a xeroform gauze tampon was placed in the cervix, to remain until the operation. The author believes it better to drain in these cases, although some peritonize with great care and use no drainage tube. Up to the present time total vaginal hysterectomy has given results a little worse than those of the Wertheim operation, the mortality being a little less at the time of operation. As the years have passed there has been an evolution from amputation of the cervix to the Wertheim operation, which shows that we are on the right track. Cases have become more operable owing to the greater knowledge of the subject by the public and the larger number of cases seen early. By using abdominal hysterectomy we get better light to search for the diseased glands and thus increase the number of cures.

Subdivisions of Chronic Metritis.—W. F. Shaw (*Proc. Roy. Soc. Med.*, 1914, vii, Obst. and Gyn. Sect., 374) defines "chronic metritis" as a clinical term which is used to designate uteri which are regularly enlarged, firm, and cause hemorrhage, pain, or leukorrhea.

There are at least two classes of chronic metritis: (*a*) chronic subinvolution; (*b*) hypertrophy.

These two classes can always be distinguished by the arrangement of the elastic tissue.

Nulliparous and parous uteri can always be distinguished by the arrangement of the elastic tissue. (*a*) In a nulliparous uterus the elastic tissue is confined chiefly to the internal elastic lamina of blood-vessels with only very thin fibrils in the media, adventitia, and between the muscle fasciculi of the myometrium; (*b*) in a parous uterus some thick strands of elastic tissue can always be found surrounding some of the blood-vessels.

In the hypertrophic form of chronic metritis the arrangement of the elastic tissue is the same as in a virgin uterus.

In the subinvoluted form of chronic metritis large deposits of elastic tissue are found in the walls and around the blood-vessels.

The hypertrophic form is primarily due to a hypertrophy of the endometrium which stimulates uterine contraction, and in course of time produces a "work hypertrophy."

The chronic subinvoluted form results after parturition when, from any cause, involution does not occur normally.

Treatment of the Sac in Femoral Hernia.—The following method of dealing with the sac of a femoral hernia is recommended by J. P. Buckley (*Lancet*, Dec. 19, 1914). The skin incision commences about one and one-half inches above the inner end of Poupart's ligament and vertically above the crural canal and extends down to one and one-half inches below the external opening of the canal with a slight convexity outward. The hernial sac, covered by its layer of preperitoneal fat, is exposed and separated as far as the opening of the crural canal into the thigh.

The upper end of the wound is held open by retractors, the surface of the aponeurosis of the external oblique muscle cleaned and an incision made in it parallel to its fibers about two inches long and one-half inch above the external ring of the inguinal canal. The conjoined tendon is thereby exposed.

The preperitoneal fat, covering the true sac of the hernia, is removed as completely as possible.

An opening is made with scissors at the apex of the sac, the contents, if any, are reduced, and any adhesions separated. The edges of the sac are held apart by Spencer Wells forceps, and the forefinger is passed through the crural canal into the abdominal cavity. The finger when passed is flexed forward so that the tip presses against the conjoined tendon. A pair of closed curved "catch" forceps is passed along the flexor surface of the inserted finger until the tip of the forceps is against the conjoined tendon; the tip of the forceps is pushed through the conjoined tendon, and appears at the upper end of the skin incision. The opposed surfaces of the blades of the forceps are grooved, the better to hold a closed pair of Kocher's hernia forceps, the tips of whose blades are now inserted between the blades of the curved forceps. The latter are withdrawn with the Kocher forceps in their grip, so that the blades of the latter forceps appear at the opening at the apex of the hernial sac.

The edges of the sac are then caught between the blades of the Kocher forceps and the sac is pulled inside out, appearing through the conjoined tendon, and the peritoneal lining of the crural canal is stripped completely away from the canal and invaginated together with the sac of the hernia.

The sac is transfixed with a full-curved needle, threaded with catgut, close to the conjoined tendon, ligatured, and then cut away. The stump is then fixed to the conjoined tendon.

The slit in the aponeurosis of the external oblique muscle is closed with a continuous catgut suture; the pectineus muscle and fascia are brought into apposition with Poupart's ligament by a stout catgut suture; the skin incision is closed with silkworm-gut, and a gauze dressing and firm spica bandage applied.

Migratory Adenomyomata of the Uterus.—It is the want of demonstrable connection with the uterus that has kept alive the theory of origin of adenomyomata from aberrant remains of the Müllerian or Wolffian ducts. A. Leitsch (*Proc. Roy. Soc. Med.*, 1914, vii, Obs. and Gyn. Sect., 393) has recently examined a specimen of adenomyoma situated at the base of the right broad ligament which was still connected to the posterior wall of the uterus low down by a thin pedicle. He believes that the sequence of events was almost certainly as follows: An adenomyoma having started from the endometrium migrated, or was extruded, through the wall posteriorly; owing to hemorrhage occurring during a menstrual period the serous surface was broken; the loaded and dependent sigmoid colon became adherent to this; the glandular constituents infiltrated the wall of the sigmoid; the adhesion became attenuated by movements of the intestine, and at operation the slender adhesion was broken, leaving a discoid portion on the uterus and an abraded area on the colon. Supposing a greater length of time had elapsed the scar on the sigmoid might have healed over and the evidence of connection between the two would have been quite lost. As it is, it serves to show how the tumors infiltrate and migrate, and we need not invoke the theory of rest-cell origin to explain the occurrence of such tumors in situations at a distance from the endometrium.

Histological and Clinical Changes Induced by Radium in Carcinoma and Sarcoma.—In studying the histological changes induced by the action of radium rays in two cases, W. H. B. Aikins and K. M. B. Simon (*Domin. Med. Month.*, Sept., 1914) find that in sarcomata the retrogression takes place according to the following law:

The size of the body and of the nucleus of the large cells decreases.

As they shrink the neoplastic elements elongate, the shape of the nucleus becomes regular, and they eventually assume the form of large embryonic connective-tissue cells, forming into a celled mass similar to that of a true fibroma. Thus sarcomata are transformed by radium into a tissue analagous to that of a fibroma with myxomatous changes.

As regards epitheliomata and carcinomata, under the influence of the radium rays, the following change takes place:

The cells gradually diminish in size and staining properties.

This atrophy corresponds not to the metamorphosis of these definite formed elements, but to their destruction as shown by keratinization or absorption.

The epitheliomatous cells disappear either by means of progressive absorption of protoplasm and nuclei through the leukocytic infiltration or by a sort of granular degeneration.

The other processes associated with the development of every epithelial tumor are arrested, while vascular connective tissue is organized according to the method just described.

As proof that the changes initiated by radium in the tumors are such as to lead to immunity, great importance must be attached to the cellular infiltration, first leukocytic, then later a round-cell infiltration. In has been recently shown these require different reactions of the tissue for their function, hence radium must affect the blood. These infiltrations have always been noted in all cases of experimental transplantation of malignant cells, and always accompany the cases in which the animal becomes immune and the tumor disintegrated.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATION.

THE TREATMENT OF CERVICAL LYMPHADENITIS IN CHILDREN.

BY

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The lymphatic glands of the neck are more frequently affected than any other group of the superficial lymph glands of the body. It is because the areas they drain are frequently infected in children.

While cervical lymphadenitis may be the result of certain systemic diseases, the majority of cases are due to some local infection of the scalp, face, ears, mouth, nose or throat.

The sovereign remedy for cervical lymphadenitis with the majority of physicians is ichthyol ointment. It is used or rather misused very often without any definite therapeutic reason. The young physician writes for it because the older and more favored one prescribes it.

Ichthyol ointment usually causes suppuration with abscess formation of the affected lymphatic glands, and ultimately scar formation. In those few cases where it seems to do some good, the application of this ointment is undesirable because the treatment is tedious, uncleanly and the smell is disagreeable.

There are some physicians who treat cervical lymphadenitis with an ointment of potassium iodide, Ung. Potassii Iodidi U. S. P. with the hope that this ointment will cause absorption of the inflamed and hypertrophied lymph nodes. This treatment has never, to my knowledge, done anybody any good.

Ung. Credé is occasionally prescribed by some physicians with the idea that this silver preparation will act as an antiseptic. It is of doubtful value in these cases and is too expensive and uncleanly.

I have never seen a case of cervical lymphadenitis successfully treated with this ointment.

There are still a few physicians who prescribe iodoform ointment, Ung. Iodoformi U. S. P. for cervical lymphadenitis. This foul-smelling remedy is a poor inheritance from the dark medical ages. The application of iodoform ointment is enough to make sick the patient and everybody that comes in touch with him including perhaps the pathogenic microorganisms which are the original cause of the trouble.

To treat properly cervical lymphadenitis the physician must begin with the source of the trouble. Every enlarged group of lymph glands is a guide to some focal infection which is to be traced and effectively treated.

As a local application to the lymph glands a weak dilution of liquor Burrowi (Liq. Aluminii Acetat, 8 per cent.), a tablespoonful to a half glass of cold water, will do more good than any ointment. Several layers of gauze or old linen are made thoroughly wet with this solution, the excess of the liquid is then wrung out and the moist gauze or linen applied to the neck covered with oiled silk and absorbent cotton or flannel. This application is changed every two or three hours during the acute stage, later it may be changed two or three times a day. In some neglected cases it may be necessary to keep up with this treatment for some time in order to get good results.

In cases of tuberculous cervical lymphadenitis, the patient should be treated on the general plan of tuberculosis. The enucliation of the tonsils which are in many cases the original source of the infection may be necessary. If tonsillectomy is not indicated, a mild antiseptic gargle, as liquor antisepticus alkalinus a tablespoonful to a quarter of a glass of warm water, should be used. The local application of liquor Burrowi will help under all circumstances.

Should this treatment be unsuccessful in tuberculous lymphadenitis a competent surgeon should be consulted.

In lymphadenitis due to some systemic disease, the underlying disease must receive its appropriate treatment.

The good results which I had with this local application may be mainly due to the hydrotherapy and not to the antiseptic action of liquor Burrowi. However that may be, in the majority of cases this treatment does more good than any ointment and it is clean and free from any objectionable odor.

1450 LEXINGTON AVENUE.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS.

Meeting of December 10, 1914.

William P. Northrup, M. D., *in the Chair.*

CASES SHOWING THE EFFECT OF BLOOD TRANSFUSION IN PURPURA HEMORRHAGICA, HENOCH'S PURPURA, CHRONIC SEPSIS, ETC.

Dr. Edward Peterson stated that in the hemorrhagic diseases of the new-born human blood serum, whole blood injected subcutaneously, and blood given by transfusion, had a specific action in correcting the dyscrasia. In fact, the best results were obtained in all types of pathological hemorrhage when treated by blood transfusion, or by the subcutaneous injection of human serum. Of the two methods the former had proven the more efficacious. After transfusion there was increase in blood pressure, in the number of red cells, in the percentage of hemoglobin, and the coagulation time was shortened. Besides being hemostatic, whole blood, administered by transfusion, stimulated the hemopoietic functions, and there was clinical evidence that it was also antitoxic and bactericidal.

Case I. *Purpura Hemorrhagica.*—This patient, four and one-half years of age, was admitted to the Post-Graduate Hospital on April 16, 1914. His parents were Russian Hebrews. The child was normal at birth, weighed 9 pounds and had always been well since, with the exception that he had measles at the age of one year.

His present illness began April 12, 1914, at which time he began to bleed from both ears and from the nose, but not from the gums, mouth, or throat. A petechial rash appeared on the feet, legs, hands and arms. Later large ecchymoses appeared on the forehead, on the eyelids, and under the eyes, and then on the thighs and legs. There were small ecchymotic spots on the body also. When the lobe of the ear was pricked for a blood examination, there was persistent oozing from the point of puncture.

The laboratory report showed red cells 4,300,000; hemoglobin 68 per cent.; leukocytes 16,200, with 74 per cent. polymorphonuclears; lymphocytes 23 per cent.; transitionals 2 per cent. and eosinophiles 1 per cent. The blood culture was negative. The urine was normal. The ear discharge showed the Bacillus pyocyaneus. The feces showed some blood microscopically. The temperature and pulse were only slightly elevated, but the child was restless, irritable and cried constantly. A diagnosis of Henoch's purpura was made.

The treatment consisted in the subcutaneous injection of 20 c.c. of the mother's blood at the time of admission. Blood transfusion was then suggested and the seventeen-year-old brother agreed to act as the donor. The hemolysis and agglutination tests were negative. On April 18, by the syringe cannula method of Lindeman, a transfusion of between 250 and 300 c.c. of blood was given. The bleeding tendency ended abruptly and up to the present time has shown no tendency to recur. The child was kept under observation in the hospital for twelve days and had been seen since. The discharge from the right ear had also been abated.

CASE II. *Mild Secondary Anemia Following Injury.*—This patient was a male child eighteen months of age who gave a history of having had a supposed meningitis, double otitis media and bronchopneumonia. He had been breast fed and then given a regular diet except for meat. On August 15 he fell down a flight of stone steps striking on his left temporo-parietal region and producing a decided lump and contusion. He was not rendered unconscious and had no paralysis. Two days later he seemed drowsy, lost his appetite and occasionally vomited. For three weeks he lay in a semicomatose condition, then gradually his mental condition cleared. While there was no paralysis the child could not stand or sit without support. He was admitted to the Post-Graduate Hospital September 30, 1914, in a very relaxed and emaciated condition, his weight at this time being 16 pounds 8 ounces.

Physical examination showed a double otitis media and moist râles over both lungs. His temperature was very irregular, ranging from 97 to 104° F.

The laboratory report showed a heavy trace of albumen in the urine but no pyelitis. The Widal reaction was negative. The blood count showed red cells 3,600,000; hemoglogin 54 per cent.; leukocytes 38,000, with 78 per cent. polymorphonuclears and 22 per cent. lymphocytes.

At the request of Dr. Dennett the boy was transfused on October 22, 1914, the mother acting as the donor; the amount of blood given was 350 c.c. The improvement commenced with the operation and progress toward recovery has been uninterrupted.

After transfusion the blood count showed red cells 4,456,000; hemoglobin 68 per cent.; the leukocytes had dropped to 12,300.

CASE III. *Henoch's Purpura.*—This patient was a girl eleven years of age, who was admitted to the Post-Graduate Hospital on May 21, 1914. Her parents were Austrian Hebrews; her family history negative except for measles and scarlet fever.

The patient's present illness began two months previous to her admission to the hospital with diarrhea and abdominal cramps. The abdominal pain increased in severity and was most marked on the right side, particularly in the right lower quadrant. Appendicitis or nephrolithiasis was suspected. A rash appeared on the legs, knees, hands and elbows. Blood was passed by rectum. The temperature was 102° F., and pulse 140. At this time any slight trauma would be followed by ecchymosis. A little later the child had three convulsions, evidently of uremic origin as the urine showed blood; there was edema of the feet, legs, face, abdomen and back which progressed until there was general anasarca. This edema had gradually disappeared until at the time of admission to the hospital it was not noticeable.

The patient was poorly nourished, sallow and looked chronically ill. The lips were thin and anemic, but otherwise physical examination revealed nothing abnormal except that the postcervical chain of glands, particularly on the left, were slightly enlarged. The muscular development was poor and there was a rachitic rosary present. The abdomen showed a tendency to "pot-belly" but there were no special points of tenderness. The liver was somewhat enlarged. The cecum was not markedly enlarged but a slight succussion was obtained. There were purpuric spots on both knees and also large ecchymoses, about one and one-half inches in diameter, on the left external malleolus. The left epitrochlear gland was palpable and the inguinal glands palpable and slightly enlarged.

The laboratory report showed that the urine contained a moderate amount of albumen, red cells, and hyaline and granular casts. There was blood in the stools both microscopically and chemically. The Wassermann reaction was negative. Blood examination showed red blood cells 3,168,000; hemoglobin 35 per cent.; white cells 18,900, with 77 per cent. polymorphonuclears and 23 per cent. lymphocytes.

The child was given a blood transfusion of 270 c.c., the father being the donor, and the preliminary blood tests having proved satisfactory. The transfusion was given on May 25 and the child looked and felt better immediately. She was discharged from the hospital on June 1 at which time the blood count showed red cells 4,256,000; hemoglobin 65 per cent.; leukocytes 11,700, with 60 per cent. polymorphonuclears and 40 per cent. lymphocytes.

CASE IV. *Chronic Sepsis Following Pneumonia and Empyema.*—This patient was born October 23, 1912, and had been well until the present illness. He had had pneumonia in the latter part of July and was brought to the hospital three weeks later, August 8, 1914, with an empyema on the right side. He was operated upon by Dr. Vincent. His weight at the time of the operation was 20 pounds, 12 ounces. He ran a very high temperature and gradually lost weight and strength. He refused nourishment and was forced to eat. This was followed by diarrhea which further weakened the boy.

He was very sallow, yellow and septic looking; there was marked emaciation of the lower extremities and the patient was unable to sit or stand alone. There was moderate drainage from the empyema wound but no pocketing. The prognosis was considered hopeless, but as a last resort transfusion was suggested. It was not expected to accomplish anything. A transfusion of 235 c.c. of blood, the mother being the donor, was given. The temperature dropped immediately and remained down since. The child's appetite was ravenous. The blood count before transfusion was red blood cells 3,847,000 and hemoglobin 40 per cent.; to-day the red blood cells numbered 4,220,000 and hemoglobin was 77 per cent.

DISCUSSION.

DR. ALFRED M. HESS said that in the treatment of the conditions under discussion by serum injection or blood transfusion, we should make a sharp distinction between immediate results and permanent ones. In cases in which there was a possibility of this treatment replacing blood, stopping hemorrhage or combating sepsis it should be used. It should be remembered that in purpura hemorrhagica attacks were sometimes very infrequent. In one case coming under his observation there was a recurrence of the condition after ten years; in other instances it recurred at longer or shorter intervals, so that whether transfusion was of permanent advantage in purpura hemorrhagica remained to be seen. Dr. Hess had one case of hemophilia in which this treatment did no good; the patient was just the same as ever and the coagulation time of the blood was just as long. In another case of purpura hemorrhagica which had come to his attention transfusion had done no apparent good, and in still another case, that Dr. Longcope had told of, transfusion had been done three or four times within six weeks; the hemorrhage each time recurred, so that whether transfusion was of more than immediate advantage was problematical.

Another method which he had used was that of defibrinating the patient's own blood and reinjecting it. This stopped the hemorrhage. In one case this procedure had been carried out three times and it stopped the hemorrhage for a week or ten days after the serum was injected. This method had the advantage of being highly practical; no hemolytic tests were required, no difficult technic, no donor. These injections of autogenous blood should be tried in cases of purpura with hemorrhage.

DR. WILLIAM SHANNON had seen a case of hemoptysis recently and Dr. Hess had also seen it. The child had been bleeding for the last week and the history showed that hemophilia was a family characteristic. He had seen this case five weeks ago for the first time and there was a distinct history of hemophilia and a history of a rheumatic purpura. There seemed to be a combination of the two conditions. It seemed that this was a case in which transfusion might be of benefit.

DR. M. FISHBERG read a paper on

TUBERCULIN REACTION AMONG THE CHILDREN OF THE POOR IN NEW YORK CITY.

One year ago he reported on the tuberculin test in 692 children of tuberculous parentage among which the reaction was found positive in 67 per cent. of cases, and at the age of fourteen the proportion of "reactors" was even as high as 83.79 per cent.

He now reported on the application of the von Pirquet test to 588 children of nontuberculous parents. They were all of poor economic and social status, depending partly or wholly on charity for subsistence. On the whole they were considered healthy by their parents. They lived in the tenement district of New York City.

He found that 52.72 per cent. showed positive reactions to the cutaneous tuberculin test. Under 1 year of age only 10 per cent. reacted; between 1 and 2 years of age, 33.33 per cent.; between 3 and 4 years of age, 41.25 per cent.; between 5 and 6 years of age, 50 per cent.; between 7 and 10, 64.74 per cent.; between 11 and 14, 69.4 per cent.; and at 14 years, 75 per cent.

These figures, although apparently startling, are in agreement with conditions found in various European cities.

Dr. Godfrey R. Pisek asked Dr. Fishberg whether in the families ruled out as not having tuberculosis there were any boarders or lodgers. He also would like to know whether the converse of his statement was not the more important; whether if there was no reaction there was no possibility of the child's having tuberculosis (excluding terminal cases, of course). If this were true the reaction would still be of distinct value.

Dr. Abraham Hymanson in an article on "Tuberculosis in Young Children," published in the Archives of Pediatrics in August, 1912, had stated that during the years of 1909 and 1910 he applied the Moro and von Pirquet tests on sixty-eight infants from two days to two weeks old, the mothers being apparently free from tuberculosis, and none of these children showed any trace of the disease. In another series of eighteen cases he had applied both of these tests, not only in the infants but in the mothers also. Four of the mothers showed positive reaction and three of these showed some physical signs of the disease and the sputum of one mother was positive. The infants invariably showed a negative reaction. He had looked for enlarged glands in eighty-six infants, but found none, with the exception of one infant, in which all the glands were enlarged. There was no history of syphilis in this case. Dr. O. Bondy applied the cutaneous tuberculin reaction in the new-born in 350 cases between the second and fourth days after delivery and found the test always negative, though he obtained a positive test in seventy-one of the mothers. Drs. Paten and Griemert applied the von Pirquet test in fifty-three children less than two weeks old, in four less than four weeks old, the mothers being apparently free from tuberculosis, and not one of the children showed a trace of reaction. Other observers had made similar tests and the fact seemed to be established that almost all infants, with very few exceptions, were born free from tuberculosis, but that they contracted it during infancy or childhood.

DISCUSSION.

Dr. Leon T. LeWald had made a radiographic examination of the lungs of many children who had given a positive tuberculin reaction and on no occasion had he found lung lesions, except in miliary tuberculosis; even when the children showed positive signs of the disease the lung was not infiltrated, but the process was located somewhere else in the body, in the bones, joints or lymph nodes, but not in the lungs. A tuberculous infiltration of the lungs in children was certainly rare in those that reacted positively to the tuberculin test except in miliary tuberculosis.

Dr. Fishberg, in closing the discussion, said that Dr. Pisek's question was a very proper one; there might have been some boarders. The ubiquitousness of tuberculosis was much more extensive than was appreciated. In an investigation of an isolated mountainous district in Scandinavia with a population of 100, among whom there had not been a death from tuberculosis for ten or fifteen years, Overland found that 75 per cent. of the population reacted positive to the tuberculin test. After investigation it was found that the village teacher was a consumptive and responsible for this high percentage of infection with tuberculosis. Direct contact was not necessary in order to transmit the disease. This is evident from the fact that a cow reacting positively to tuberculin placed with a herd, every one of which reacted negatively, results after a few months in a considerable number of positive reactions among that herd, though there might be no well-developed instance of tuberculosis. In regard to phthisiogenesis, recent research has shown very little about how tuberculosis was acquired. In the last analysis he did not know how it was acquired and others did not know.

As to the negative reaction, a negative reaction often meant nothing whatever.

Where the reaction was positive and the disease was present it need not necessarily be in the lung, but might be in a joint, in glands, or other organs since it was the organism that responded to the tuberculin.

EXPERIENCE WITH THE DIPHTHERIA TOXIN SKIN REACTION OF SCHICK.

Dr. William H. Park said that in order to demonstrate the positive and negative Schick reactions he had brought with him two students who had submitted themselves to the test. The Schick reaction was just the reverse of all the other tests in that a negative reaction meant immunization and a positive one meant susceptibility to diphtheria. The Schick reaction was due to the direct toxic action of the toxin of diphtheria; the negative reaction meant that the toxin was neutralized and a positive reaction meant that the subject did not have sufficient antitoxin in the blood to neutralize the toxin introduced. There was also the pseudoreaction which was anaphylactic in type; in reality it was due to the endotoxins. It gave the impression of a much more decided reaction than the positive reaction; there was slight infiltration and hyperemia at the site of the injection.

Dr. Park then exhibited two guinea-pigs. The one had been subjected to a double Schick test, that is, at one site he had been given an injection of the diphtheria toxin alone, while at another site he had been given a similar dose of toxin together with a dose of antitoxin large enough to neutralize it. At the site of the first injection there was an induration, while at the site of the second injection the toxin had been completely neutralized and there was no lesion. A second pig had been inoculated with a nonvirulent culture and showed the pseudoreaction which was larger than the true reaction and meant that the guinea-pig was immune. It took a week or two before the true reaction disappeared, but the pseudoreaction came quickly and went quickly, and had nothing to do with immunity. The anaphylaxis was due to the culture broth.

In applying this test the dosage used was about one-fiftieth of the fatal dose, though the dose might be as low as one-sixtieth or as high as one-thirtieth, but with a larger dose there was danger of necrosis. If there was not an active antitoxin present and the reaction was doubtful, the subject was put down as nonimmune.

Dr. Park exhibited charts showing the result of the Schick test in children, from the time of birth to the fifteenth year, and in adults, when the toxin was administered in the various ways—subcutaneous, intramuscularly and intravenously. In children between the ages of five and fifteen years 50 per cent. showed a positive reaction, so that half of the children between these ages were immune and half were not. Among adults 70 per cent. were immune and needed no immunization against diphtheria. In certain children, "once immune, always immune" seemed to hold good. In children who had had the disease the Schick test might be used to determine the limit of immunity.

At the Willard Parker Hospital they were not immunizing all the children admitted to the scarlet-fever wards, but only those who showed a positive Schick reaction. Of ninety children showing a positive Schick reaction, after an immunizing dose of antitoxin twenty became really immune and seventeen developed a larger amount of antitoxin in the blood. A child that gave a negative Schick test was perfectly safe among diphtheria carriers. Several other applications of this reaction could be made. One of these showed how rapidly antitoxin reached the skin, the toxic doses having been given six hours before the antitoxin by the different methods,—subcutaneously, intramuscularly and intravenously. When an intravenous injection of 1000 units of antitoxin was given six hours before the toxin, it suppressed the reaction; when given four hours before, it greatly diminished the reaction; and when given two hours before, it absolutely prevented a reaction. When the toxin was given intravenously the reaction was increased.

There was another way in which the Schick test might be of some diagnostic value. If a case was supposed clinically to be diphtheria and one got a negative Schick reaction and a positive diphtheria culture, one might conclude that the patient was only a carrier and did not have a true diphtheria; that patient might carry a virulent bacilli and yet have a nonvirulent tonsillitis. About one-third of the cases of diphtheria developed antitoxin while about two-thirds did not. When one positive Schick test was found in a family, all the members of that family were likely to have a positive test. Dr. Park said they were now making experiments in the endeavor to vaccinate against diphtheria with the dead bacilli as they were doing against typhoid fever. They felt sure that an attack of diphtheria gave immunity for some time, but this immunity might be due to some other bactericidal substance.

The speaker wished to caution his audience in regard to using the Schick test. The injections should be made intramuscularly or subcutaneously and one should use a fresh dilution, not one that had been standing for any length of time.

In response to the question as to how the diphtheria toxin was prepared, whether it was prepared like the tuberculin, Dr. Park said that the diphtheria toxin was prepared differently from the tuberculin, as in the tuberculin they wanted to keep the endotoxins while with the diphtheria toxin they tried to get rid of the endotoxins. They had been using a six-day product and were trying to get one of only forty-eight hours.

Dr. Park said the immunity seemed to be acquired; about 90 per cent. of adults and 90 per cent. of infants gave a negative Schick test. During infancy and the early years of childhood the immunity dropped off into 30 per cent., and then the antitoxin began to be produced again as the children grew older; why, no one knew. There was a large amount of antitoxin produced by some individuals; as much as 15 units had been observed and why it should continue to be produced beyond the apparent need was beyond comprehension. It might be that there was some saprophyte making it.

Dr. Rufus Cole, in reply to Dr. Park's question, said that, while it might be practical to treat all patients suffering from pneumonia with a polyvalent Type I and Type II serum, a considerable number of patients with infections due to the other types, in which patients such a serum could do no good, would thus be exposed to the possible harmful effects of the administration of such large amounts of horse serum. While the administration of these large amounts of horse serum is apparently without harm, yet our experience and knowledge on the subject is still too slight to be certain of this. The only advantage of a hit or miss kind of treatment is that the bother and inconvenience of making a determination of type in each individual case is avoided. However if clinical laboratories are prepared to make such a diagnosis, the difficulties are not very great. The same objections that are raised to the administration of diphtheria antitoxin to all cases of tonsillitis can be raised against the method of injecting all patients with pneumonia with a polyvalent Type I and Type II serum.

Moreover, at present, such a method of administration of the serum would add little to our knowledge as to whether or not either the Type I or Type II serum, or both, are efficacious in treatment. Not only is the determination of type of organism in the individual case of importance in treatment, but it also has great prognostic significance, and is therefore of clinical value, even though no specific treatment is undertaken.

Dr. Cole said, in reply to the question as to the method of determination of types, that the pneumococci were isolated by injection of the washed sputum into the peritoneal cavity of a mouse. By agglutination experiments it could then be determined whether or not the organisms isolated were of Type I or Type II. If they are of Type III, this can be determined by the appearance of the exudate, and by morphology of the organisms. If the organisms were not agglutinated, and did not correspond to organisms of Type III, they were considered to belong to group IV. Parallel protection tests carried out on a large number of organisms so isolated show that the method can be safely used for the rapid determination of type. By this method the type of organism infecting any given case can usually be determined within six to eight hours.

In reply to the question as to whether a mixture of the sera of Types I and II has been found practical in treatment, Dr. Cole said that an effort had been made to immunize a horse to both types of organism. The serum of this horse now has high protective power to Type I, but is still low to Type II. It is quite possible, however, that after further treatment the serum will acquire a high protective power against organisms of Type II. Even though this can be accomplished, however, it will be better to give the monovalent appropriate serum in case the type of organism can be determined.

In reply to the question as to whether he thought infection in pneumonia was a direct infection of the lung or was a hematogenous infection, he stated that his clinical and experimental studies led him to believe that infection of the lung occurred through the bronchus, and not through the blood stream. While in certain cases the infection may be due to organisms previously present in the mouth, a so-called autogenous infection, accumulating evidence seemed to indicate that, in a majority of the cases, infection occurred from other cases or from carriers of the virus. This is probably true in the cases due to the fixed types, while in the cases due to Type IV, autogenous infection may occur.

In reply to the question as to whether the serum deteriorated with time, Dr. Cole stated that at present no reply could be given. Serum kept in the laboratory for a year, however, still shows high protective titer, as high as that originally found.

In reply to the question as to whether transformation of one type of pneumococci into another might occur, Dr. Cole stated that no such transformation had yet been observed by him or by his associates, although many races of pneumococci had now been under observation for long periods of time, some of them for as long as three years. Various races have been passed repeatedly through animals and transferred frequently on artificial media, but, so far, no transformation of type has been observed. Organisms had also been isolated from the same patient at different periods of the disease, and the various cultures have always proved to be of the same type. Moreover, agglutination experiments made by Dr. Chickering had shown that in the blood of patients agglutinins are present only for the type of organism isolated.

In reply to the question as to whether mixed infections, with organisms of more than one group, might occur, Dr. Cole said that such mixed infections had not been observed.

In reply to Dr. Kerley's question as to why the mortality of pneumonia in children is lower than that in adults, Dr. Cole stated that he had made no studies bearing on this point, and that he could offer no theories to explain it.

DISCUSSION.

Dr. Park said there were two questions which he would like to ask Dr. Cole. They were frequently called up and asked in regard to the administration of vaccines in pneumonia and they had been telling the inquirers not to use the serums. Would using Type I serum not be of some help? It might do good in about one-half the cases; of course it would do no good in Type III. If one does not know with which type of pneumococcus he is dealing what is the best course to pursue with regard to the vaccines?

As to the prognosis: after one has seen a case of pneumonia and then learns twenty-four hours later to which type it belongs, should he be guided in his prognosis by the group to which the case belongs or by the clinical appearance of the patient? If, for instance, the patient had a light attack and one finds that he has the bacilli belonging to Group III, would you give a serious prognosis based on the laboratory findings?

Dr. Cole, in reply to Dr. Park's question, said that if one was sure that he had a certain type the thing to do was to administer the appropriate serum, but to be effective one had to give large amounts with animals. One might do harm with such large amounts of sera and their administration would hardly be practical. It was hardly worth while to try a serum unless one knew with what type of pneumococcus he was dealing and was sure of doing good, until we had had further experience with the various types.

The determination of the type was of great value in prognosis. Just yesterday he had seen a man sixty-five years of age who was in a very serious condition, but the organism was found to belong to Group IV and he felt more cheerful about him. He felt sure that this differentiation of types was of material aid in diagnosis.

In reply to the question as to how they determined the various groups he said that all pneumococci were differentiated by the agglutination and protection tests. They made the protection tests by the simple method in injecting animals.

In reply to the question as to whether a mixture of the serra of two groups had been found practical, Dr. Cole said they used an immunized horse and titer to Type II and that it still showed a low titer and variable results. If one could determine the type it was better to give the serum for that type alone.

Dr. Henry Heiman asked Dr. Cole whether he considered lobar pneumonia an extension of a hematogenous affection.

Dr. Cole said that he felt from experience that pneumonia was a direct infection of the lung and not a hematogenous affection. They were making investigations with animals that led him to think that in infection perhaps more than contact played a rôle, that there was an autogenous factor.

Dr. Park said that Group IV was not a group in the proper sense of the word; this group might embrace a large number of varieties and there might be some semisaprophytic ones. This was an important question with him as it had some relation to the present discussion in regard to the subway crowding.

Dr. Roper asked if it had been observed whether one type of pneumococcus bacilli was transformed into another type.

Dr. Hymanson asked if any deterioration in the serum had been noted with time.

Dr. Cole said that as to the matter of deterioration with time, he could not say as they had not kept it long enough. Six months was the longest that they had kept it and it did not seem to deteriorate in that time, but it might later.

As to the possibility of transformation of one type of pneumococci to another they had never seen one type transformed to another. Type I had been passed through 125 animals and remained Type I always. Transformation might be possible but they had never observed it. There seemed to be no more likelihood of the types being transformed than of a colon bacillus becoming a typhoid bacillus. They continued to be the same type throughout. They had examined the types during disease and during convalescence and agglutination tests always showed the same organism. What Dr. Park had said of Group IV was true; there might be 150 varieties, but each was an individual type and absolutely distinct. They seemed to have found two varieties of organism in South Africa which they did not find here, but which were absolutely distinct.

In reply to the question as to whether a patient might have an infection consisting of organisms of more than one group, Dr. Cole said that he had never found Type I and Type II at the same time. If Type I and Type IV were both present, Type I came out and Type IV did not. Type I was more virulent and suppressed Type IV. One never got an "even up" mixture.

Dr. Charles Gilmore Kerley asked Dr. Cole if he had made any observations as to the reason the mortality from pneumonia was lower in children than in adults.

Dr. Cole had made no observations along that line and had no theories to offer to account for it.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Alcoholic Extracts of Vegetables as Preventives of Barlow's Disease.—E. Freise (*Monatsschr. f. Kinderheil.*, Bd. xii, No. 12, 1914) says that clinical observation and examination shows that Barlow's disease is due to disturbances of nutrition of alimentary origin. The modern belief is that the ordinary materials used in feeding infants do not contain certain chemical compounds that are necessary to perfect nutrition, and from this deprivation scurvy results. The author made an extract of *bata vulgaris*, by washing them, chopping, drying twelve hours, and then extracting with alcohol the materials contained. The author fed a case having scurvy with ordinary foods accompanied by this extract and got improvement and repair of bones as was shown by the *x*-ray plates. On the fifth day of the feeding a fresh attack of scurvy symptoms took place, and this was immediately affected by the extract. It is impossible to give a young child sufficient vegetables to contain enough vegetable extracts to cure scurvy, on account of the lack of digestion of large amounts of vegetables. This beet extract is an excellent substitute. We know nothing of the chemical nature of the substances obtained in the extract. Barlow's disease is characterized by a lack of mineral salts. This extract may cause physiological fixation of these salts, and thus have its beneficial action. A local effect on the bloodvessels is seen which causes repair of their walls; and thus improvement takes place.

Vaccination of Infants against Diphtheria.—P. Rohmer (*Berl. klin. Woch.*, July 20, 1914), believes that he can produce in infants a genuine protection against diphtheria by means of vaccinations with Behring's serum. He injects but 1 c.c. at a time intracutaneously in the forearm. The injection is repeated after two weeks. The author does not believe that infants under five months of age should be excluded from such protection.

Permeability of the Intestines of Infants to Foreign Albumin and Double Sugars.—Hayashi (*Monatsschr. f. Kinderheil.*, Bd. xxi, Nr. 12, 1914) says that it has been shown that an artificially injured animal has an increased permeability of the intestine to crystalloids (sugar and salt) and to albuminoids. The same is seen in infants in whom acute intestinal troubles are less important than the chronic. Foreign albumins have the same powers. The author tested twenty-eight infants, at the Heidelberg Klinik, all of them free from acute intestinal troubles, and five who had recovered from such troubles. By tests with egg albumin he standardized the effects on the intestines. In normal children, after taking 15 to 20 grains of egg albumin per kilogram of body weight the albumin appears in the urine. The tolerance does not increase for the first year. In exudative diathesis the tolerance is lower than was supposed. There is still an exaggerated tolerance after the cure of an acute gastrointestinal attack. Tolerance for foreign albumins runs parallel with that for double sugars. Assimilation for cane sugar and milk sugar are about the same. There is no proof of injury to the intestine by either of these sugars.

Gastrointestinal Hemorrhage in the New-born.—P. Balard (*Bul. de la Soc. d'obst. et de gyn. de Paris*, June, 1914) says that gastrointestinal hemorrhages in the new-born may be divided as to causation into the infectious and mechanical. The mechanical almost always result from disturbances of circulation combined with difficult respiration, causing a sudden hypertension especially in the abdominal organs. There is a reflux toward the umbilical vein, which explains the frequency of hemorrhages there. If the ligature is strong this wave is thrown back upon the abdominal organs and produces intense passive congestion. As a result of severe infections there is a grave change in the blood formula of the newborn with failure of the blood to coagulate. Mechanical hemorrhages are early and isolated, and prognosis is benign. Infectious hemorrhages appear late, are multiple in localization, and incoercible, producing death of the infant.

Etiology of Scarlatina.—Editorial writer (*Presse méd.*, June, 1914) questions whether the old idea of the propagation of scarlatina by means of scales has any foundation except as the scales have become inoculated by discharges from the mouth and throat. He explains thus the undoubted cases of conveyance by means of letters, and clothing that has been carried for long distances. The hands have been infected from the mouth and so scales have remained in the letters, or the discharges have remained on the garments. Persons who approach the patients may carry germs in their clothing, shoes, and hair when they have come in contact with discharges. The germ of scarlatina is not eliminated directly by the skin. Inoculations of monkeys have proven the virulence of exudations from the tonsils. The virus of scarlatina is very resistant and remains active for many months. The author believes that abortive attacks of scarlatina with no rash are frequent. At the same time the throats contain virulent germs, which they spread about because no isolation is carried out. Epidemics of scarlatina coincide with epidemics of sore throat and these sore throats are probably true scarlatina. A most important prophylactic measure is careful disinfection of the mouth and throat in all cases of sore throat. The scarlatina patient may convey contagion from the first moment of his illness, by the discharges from the mouth. By remembering these facts we shall be able to construct a better system of prophylactic care of the patient and insure the community against the spread of the disease.

Scrofuloderma in Childhood.—K. Bahr (*Monatsschr. f. Kinderheil.*, Bd xii, Nr. 12, 1914) tells us that tuberculosis in the first years of life is singularly fatal; in sixty-nine children having tuberculosis Halin found a mortality of 83 per cent. With cases of skin tuberculosis the prognosis is better. Scrofuloderma although local depends on an infection of the blood, and hence should be as fatal as other forms. The author gives histories of five cases observed by him, all of whom were between six and twelve months of age, and all of whom were cured and remained without evidences of tuberculosis two and a half to three years after treatment. Only one of them received a specific or a special fresh-air treatment. Where there were cutaneous abscesses they were opened and injected with iodoform-glycerine. Therefore four of the cases showed spontaneous healing. Thus we see that scrofuloderma in early life is often benign.

Coagulability of the Blood in the First Weeks of Life.—Emil Flusser (*Monatsschr. f. Kinderheil*, Bd. xii, Nr. 12, 1914) gives the results of his experiments on the coagulability of blood in the first weeks of life. He examined the blood of normal and syphilitic children by the method of Wright. He finds that this method is inaccurate. The coagulation time for infants in the first two weeks is eight and one-fourth minutes in a temperature of 19 to 29° C. It is not affected by dyspeptic erythema, eczema, pemphigus neonatorum, rachitis, or cephalhematoma. In icterus neonatorum the coagulation time is eleven minutes, forty seconds, or even longer. In nine cases of hereditary syphilis with open manifestations of the disease, there were two with increased coagulation time. In latent hereditary syphilis this characteristic may be found before the earliest symptoms have shown themselves. It passes away after antisyphilitic treatment.

Atrophy in Infants.—A. Lasage (*Jour. de méd. de Paris*, Nr. 28, 1914) describes zones of hyperesthesia that are found in various forms of atrophy in infants. These occur when feeding is not suitable, and indicate a change of foods. He describes two forms of atrophy, the simple, and the spasmodic, aside from atrophy caused by tuberculosis or syphilis. In simple atrophy there is a wasting of the muscular masses, which are flaccid. There may or may not be atrophy of the bones or slow ossification: craniotabes may result, and an abnormally open fontanelle. The cause of simple atrophy is hereditary, the parents having had obesity, albuminuria, diabetes, tuberculosis, consanguinity, physiological misery, polynatality, etc. Such atrophy may be rachitic. The contrasting form is the spastic, in which there is contracture of the muscles of the thighs, the hips and knees being flexed and incapable of being extended. This may be congenital in premature debility and accompanied by a general fibrosis. Atrophy is early and severe. The principal cause of this form of spasmodic atrophy is alcoholism in the parents. In acquired spasmodic atrophy there is spasm of many muscles, but not of a tetanic character. It is not localized in the larynx or extremities. It appears in children insufficiently breast-fed, and is the spasm of inanition. There is a spasm of the sufficiently breast-fed, occurring especially in children of arthritic mothers or those having hepatic troubles. The treatment for all these forms of atrophy is a change of diet such as is appropriate to each given case, and will bring about a return of food nutrition.

Critical Study of Acetonuria Preceding Periodic Vomiting, with Reference to Etiology.—Hugo Zade (*Arch. f. Kinderheil.*, Bd. 63, H. I and II, 1914) presents a critical study of the symptomatology of cyclic vomiting, with especial reference to the etiological factors. His text is a case of typical cyclic vomiting preceded by acetonuria, in a blooming, vigorous child of five and a half years of age. In this child there was no nervous ancestry. The author gives a study of all the literature with reference to the subject. In most typical cases the attack takes place suddenly, without prodromal symptoms and without the presence of gastric, intestinal, or hepatic disturbances before the attack. The attack ends as abruptly as it begins and treatment is unsatisfactory. The recurrence takes place without previous warning under the same circumstances as the first attack. There is no rise of temperature and little change in the pulse. By some it is claimed that there is always a hereditary nervous condition, and by others that this disturbance is of a hysterical nature. The author thinks that the disease is seen in children of healthy peasants in whom there is no nervous diathesis, as well as in nervous subjects. Hence these cannot be invariable etiological factors. The character of the vomiting is that of cerebral vomiting in general. There is little nausea, and a large amount of fluid is ejected suddenly. There seems reason to suspect an irritation of the central nervous system in this vomiting, which acts reflexly on the vomiting center. After consideration of all theories the author gives the following as the most probable sequence of events: the primary acidosis depends on an acute disturbance of the metabolism of the carbohydrates. The vomiting, without nausea and with ejection of a large amount of fluid is of a reflex nature dependent on irritation of the brain. There must be active, some irritation similar to that in severe diabetes, but causing no glycosuria. The cause of the irritation may be of a psychological nature or not. Whether there are permanent changes in the nervous system remains to be demonstrated. Perhaps it may have to do with disturbances of the internal secretions, especially that of the thymus.

Marine Heliotherapy.—Em. Gajoux (*Ann. de méd. et chir. inf.*, June, 1914) gives an analysis of the papers on heliotherapy at the seashore presented at the Cannes Congress on Marine Heliotherapy. After citing the many papers read he gives the practical points derived from the various discussions. Everyone appeared in accord as to the great value of this new therapeutic measure. There are many positive factors to prove the value of the sun's rays, while a negative proof is the noncontagiousness of various surgical diseases treated in the same wards. Many authors have insisted on the value of the association of surgical with heliotherapeutic measures in surgical tuberculosis; the continued use of immobilizing devices is desirable even when the sun's rays are applied. The dangers of excessive interventions were shown, and the necessity of operation to exteriorize the lesions which are to be irradiated. In peritoneal tuberculosis not only are the clinical manifestations cured but there is an actual restitution to the original state. There is a grave error in thinking of heliotherapy as an exclusive agent, complete in itself; the sun's action should be simply an adjuvant to other methods of treatment. The marine climate by its tonic action on the general condition assists the value of the action of the sun. The good effects are in some cases to be obtained only a part of the year at the seaside, and it may be well to give winter treatment at the seaside, while the summer is spent in the mountains. In general, heliotherapeutists believe that we must have an exposure of the entire body to the sun whether or no there is a local lesion. The individual factor and the therapeutic action must be made to harmonize. Childhood has a peculiar tolerance for sunshine; we have to ascertain whether the same rules are applicable to the adult. The cutaneous pigmentation gives a favorable prognosis for the patient. Although it constitutes an obstacle to the passage of the violet rays it is a precious witness to the penetration of the luminous rays. The good effects are due especially to the chemical rays, not simply to the heat and luminous rays. Heliotherapy is of especial value in tuberculosis of the genitourinary organs in tuberculous nephritis, and in the tuberculous affections of the female genital organs, causing resolution of old exudates and inflammations of the adnexa, cessation of functional pain, and promotion of menstruation in cases of amenorrhea.

Posology of Marine Heliotherapy.—D'Oelsnitz (*Arch. de méd. des enf.*, July, 1914) endeavors to give us some rules for the employment of marine heliotherapy, as a result of his own experience and of a study of the literature of the subject. The author says that in the present state of our knowledge of the subject it is impossible to establish any exact rules regulating the use of heliotherapy. At the same time we may formulate certain propositions which may be applied practically to the administration of sun baths at the seashore. By the intensity of the sun's action in the morbid states to which it is applied heliotherapy may give rise to different results, favorable or harmful. The action of this therapeutic agent depends at the same time on the therapeutic agent and the subject treated. The variable qualities of solar light and the unequal reactions of the organism influence the clinical results. The especial properties acquired by solar light at the seashore as well as all the properties of the marine climate should be taken into consideration in the dosage of heliotherapy. We should be able to measure the intensity of the actinic rays, since these are the most active, but we possess no accurate method of doing this. We may be guided by the temperature of the rays and the duration of the exposure. Knowing the temperature most favorable to each disease the problem consists in determining the duration of the exposures according to the individual patient, the period of treatment of the disease, and the reactions obtained. A study of the modifications of temperature, pulse, and respiration produced by heliotherapy permit us to establish certain types of reaction corresponding to the adaptation or intolerance of the patient. Modification of arterial pressure and of the blood condition are difficult to systematize, but partially confirm the favorable or unfavorable effects of heliotherapy. In tuberculous affections a series of tuberculin tests allow us to judge the degree of action of heliotherapy on the disease. An individual dosage, constantly changing, is favored by the extreme variability of the morbid states, their degree of evolution, the intensity of the therapeutic agent, and the individual susceptibility. General rules may be established, which may be varied with each individual case, and the treatment increased, diminished, or suspended as circumstances may dictate.

Heliotherapy in Surgical Tuberculosis.—Geo. Vitoux (*Bull. gén. dethér.*, July 23, 1914) says that heliotherapy may be applied anywhere, even in northern countries and cloudy regions. Thalassotherapy and heliotherapy combined give better results than heliotherapy alone. The sea bath may be given warm or cold, in the room, in a bath house, or with vigorous patients in the sea itself. The sea air possesses qualities which are not present in ordinary air; these are that it contains more mineral materials, more chloride of sodium, iodine, ozone, bromine, and silicon. It is somewhat compressed and contains an added quantity of oxygen. Its effects are stimulation of the hematopoietic system with increase in number of blood cells; active leukocytosis, increase in the consumption and utilization of oxygen; increase of assimilation of albuminoids; increased remineralization; better utilization of phosphate of albumin; diminution of nitrogenous absorption; lessened uric acid production, and increased activity of the exchanges of the nervous and osseous system. The sea climate is oxidizing, remineralizing, and stimulating of organic exchanges. The use of heliotherapy should be in the open air, with the head covered and the eyes protected, preferably in a garden or a boat. Erythema should be guarded against. At first it causes sleeplessness and nervous agitation, but this soon passes away. The pains are soon lessened and contractures diminished, especially in arthritis. There are a real increase of strength and of appetite, better digestion, regular sleep, increase in weight, and decrease of sweating. The toxins excreted by the bacilli are decreased and there is a microbicidal effect on the germs themselves. In the lesions there is an encouragement of sclerosis and resolution of inflammation. Fistulæ clean and heal; diseased glands disappear. In osteoarthritis there is an increase in discharge at first, which soon lessens and becomes less purulent. The length of the cases is much abridged. Apparatus to cause fixation must be used, but for a shorter time, and in an abridged form with fenestræ to admit the sunshine to the diseased joint.

Relation of Anaphylaxis and Status Lymphaticus to Intensified Types of Disease in Infancy and Childhood.—Continuing his discussion (*abst.* AMER. JOUR. OBST., 1914, lxix, 898) of the relation of anaphylaxis and status lymphaticus to fulminant cases of pneumonia and tuberculosis, C. McNeil (*Edin. Med. Jour.*, 1914, n. s. xiii, 38, 118) says that fulminant types of bacterial infections in childhood, both acute and chronic, are accompanied by the accepted marks of status lymphaticus, that is, thymo-lymphatic hyperplasia. The great majority of cases of sudden death (classical status lymphaticus) are in reality very extreme fulminant types of bacterial infection, usually bronchopneumonia or gastroenteritis.

These intensified types of disease are examples of exaggerated anaphylaxis. If the ordinary onset of pneumonia represents a group of anaphylactic reactions, the onset of fulminant pneumonia is only a higher degree of the same biological reaction. Accepted cases of anaphylaxis show the same scale of gradation, for example, from the ordinary to the immediate reaction in serum disease. Thus fulminant pneumonia corresponds to the immediate reaction in serum disease; both are examples of exaggerated general anaphylaxis.

The intensified cutaneous reactions in scrofula are obviously types of exaggerated local anaphylaxis, while the ordinary cutaneous reaction in nonscrofulous tuberculosis represents the ordinary degree of local anaphylaxis.

Status lymphaticus is an abnormal condition of body (morbid diathesis) in which, if anaphylactic phenomena occur, they do so in an exaggerated way. The variation in degrees of anaphylaxis is to be explained by the variation in degrees of irritability on the part of the cells of the body. The highest pitch of anaphylaxis is seen where the body cells have attained a maximum of irritability; that condition of body is status lymphaticus.

Thyroid hyperplasia regularly accompanies thymo-lymphatic hyperplasia. It deserves to be regarded as an important mark of the abnormal condition of body status lymphaticus. The interpretation of thyroid hyperplasia may throw light upon the cause of status lymphaticus. It is certainly preexistent before death, and before the operation of the cause of death. From analogy of other instances of thyroid hyperplasia, where the cause of this is known, the hypothesis is advanced that in status lymphaticus the thyroid hyperplasia reflects and indicates an abnormal condition of the body cells produced by the prolonged action of some toxin, bacterial or other. This intoxication may, in some cases, be congenital, being transferred from mother to fetus just as is anaphylaxis, or acquired. There is no necessity to regard it as a permanent change.

Pituitary Disturbance as Related to Some Cases of Epilepsy, Psychoses, Etc.—B. R. Tucker (*South. Med. Jour.*, 1914, vii, 608) has begun to study his epileptic cases for a possible connection with pituitary disturbance. Only those cases were selected which showed one or more conditions supposed to be due to changed pituitary secretion, as increase in bone length or width, adiposity, sexual infantilism, change in sugar tolerance, low blood pressure, voracious appetite or underdevelopment of hair. It was thought that a possible diagnosis might be made that pituitary trouble was causing the attacks in epileptics, when beside showing clinical signs of hypopituitarism the case gave radiographic evidence of a changed sella turcica. Stereographic plates were made as the outline of the sella shows much better when taken in this manner. The writer's observations tend to show the relation of certain cases of epilepsy to hypopituitarism as pointed out by Cushing, while the radiographs, in connection with these cases, seem to support the suggestion of Johnston that irregular bony formation of the sella turcica might have some bearing on epilepsy. Cases were radiographed which showed no sella turcica changes, but every case which showed marked sella turcica change gave definite symptoms of hypopituitarism, and *vice versa*. Five of these cases are briefly reported. The attacks in all began near the time of puberty. In no case was there noticeable evidence of thyroid trouble. Only a small class of epileptics seem to show pituitary disturbance, and sella turcica radiography of promiscuous and unselected cases of epilepsy will prove disappointing. The writer has also observed a type of psychosis probably due to hypopituitarism at puberty in two very similar cases. Both of these cases showed distinct decrease in the size of the sella turcica due to erosion and enlargement of the clinoid processes. Both cases showed a probable preceding hyperpituitarism, and in neither case were there signs of neighborhood symptoms. Both of these cases were of normal or slightly above normal intelligence in early life, both were sexually underdeveloped, thin and rather tall. Both showed inability to concentrate, irritability and marked repetition of movements, and both improved upon the administration of 2 grains of the whole gland of pituitary extract three times a day. He records also two cases of hyperpituitarism.

Congenital Atresia of the Postnasal Orifice.—C. W. Richardson (*Lancet*, Aug. 15, 1914) states that the occurrence of congenital obstruction to the postnasal orifice is described by many writers as a very infrequent form of nasal deformity, but if all cases of asphyxia neonatorum were properly differentiated, we would probably find that this form of deformity is responsible for no small proportion of these cases. Congenital atresia is that form of obstruction of the postnasal orifice that takes place *in utero*, the result of a misplacement or other malformation in the embryo, not in any way due to inflammatory reaction or pressure, and usually characterized by a more or less complete partition, obstructing one or both postnasal orifices. Luschka considers the obstructing plate to be a projection upward and backward of the horizontal plate of the palate bone. The Kundrat theory is that the obstruction is due to an extension inward of the vertical plates of the palate bones. According to Hopmann, the choanal obstruction is an extreme degree of the occasionally observed choanal asymmetry. The opinion advanced by Bitot is that the plate forming the partition is a separate, independent bone, as indicated by the separate sutures evidenced therein. The diagnosis of this condition is not attended with any difficulty if one only had the thought of the disturbance in mind. In infants we have difficult breathing, cyanosis with threatened asphyxia, the characteristic struggling child with tightly drawn lips and indrawn cheeks, relieved, at last, from its impending suffocation by a crying spell; the constant repetition of this cycle. The older child and adult give the history of not breathing through the nose, unilateral or bilateral, since birth; and of extreme difficulty of rearing the child on account of the problem of feeding. An excessive and annoying thick, clear, albuminous-like mucus secretion is almost pathognomonic of congenital postnasal obstruction. In infants and adults the impermeability of the postnasal cavities from the nasal chambers can be readily demonstrated by gently douching through the anterior nares. By palpating with a probe through the anterior nares do we not only localize the seat of the obstruction, but also its probable character. Through anterior and posterior rhinoscopy, postnasal digital exploration and transillumination, we obtain additional information as to the condition of the nasal chambers. Expectant treatment aims at the establishment of artificial mouth-breathing and the proper nutrition of the infant who is unable to take nourishment in the normal manner. As soon as its condition is properly diagnosed, the infant should not be allowed to have any attacks of asphyxiation. This is accomplished by constantly holding the lower jaw slightly depressed by pressing slightly on the chin. This procedure requires someone quite alert to be constantly with the infant. The feeding must be resorted to through the medium of a spoon. The factors in favor of operation, should it be successful, are the immediate relief to the sufferer, and its ability to breathe and take nourishment normally almost immediately thereafter. Should operative intervention be delayed, the period of election for the operation is when the pharynx is sufficiently well developed to permit of easy manipulation with the guiding finger in the nasopharynx, that is as soon after the ninth month of life as practicable.

X-ray Treatment of Ringworm.—W. C. Oram (*Liverpool Med. Chir. Jour.*, 1914, xxxiv, 314) says that the ringworm fungus lies in the root of the hair, and the hair root lies in the follicle deeply embedded in the skin, where no remedial agent can reach it. The only way to bring about a speedy cure is therefore to remove the hair and with it the disease, for it is probable that no hair which has once become infected can ever become free from the disease. By the administration of a carefully measured dose of rays, an area of the head can be rendered absolutely bald, all the hair, infected or otherwise, falling out after an interval of from fourteen to twenty-one days after the exposure, leaving a perfectly healthy scalp without redness or soreness. A year ago an *x*-ray clinic was instituted by the Education Committee of the Liverpool Corporation, and during the past year 150 children have received treatment. During the period from August to December last year, forty-two children came for treatment; thirty-five of these were cured at the first exposure, *i.e.*, 85 per cent., and the average time which elapsed between the time of their first attendance and their being certified as free from ringworm and able to attend school was just under four weeks. The other 15 per cent. had to receive a second treatment, and the average time for these between their first attendance and their cure was twelve weeks. One child developed an eczema of the scalp outside the area treated. Otherwise all cases were cured within the three months' period.

Celluloid Splints in the Treatment of Acute Cases of Poliomyelitis.—F. E. Batten (*Lancet*, July 25, 1914) publishes a note to show that early splinting of cases of acute poliomeylitis with celluloid splints is attended with good results, in that it has aided the recovery of the paralyzed muscles by keeping them at rest, that it has prevented deformity, and has enabled the patient to walk. Of twenty-four cases of acute poliomyelitis seen and treated within three months of the onset, in twenty-one it was known that no malposition had arisen; three cases had not been seen recently. In one severe case, after wearing splints for a year, recovery was so far complete that splints were no longer required, and a year later it was difficult to say that there was any residual paralysis. Of the remaining cases, all still had varying degrees of weakness but no malposition of the limb. The writer describes the technic of making celluloid splints.

Infection in Tuberculous Families.—The paper of J. B. Hawes (*Bost. Med. and Surg. Jour.*, 1914, clxxi, 217) is based on a study of 600 patients, discharged from the North Reading, Lakeville, Westfield, and Rutland State Sanatoria from July 23, 1912, to October 16, 1913. He finds that tuberculous infection takes place chiefly in childhood years in the intimate contact of family life. There are three classes of consumptives which are the chief sources of family infection: the unknown case, the known case treated in his own home, and the returned sanatorium or hospital patient. The class of returned sanatorium patients is the most important one and best repays out efforts. The responsibility of the state toward its patients does not end when the patient is discharged, nor does the responsibility of the municipality end when the patient leaves for a state sanatorium. Cooperation between state and local forces must be constantly striven for. Tuberculosis is primarily a local problem. The state may well direct and advise but not replace local work.

Vaccine Treatment of Pertussis.—From a review of the literature which includes the reports of 1445 cases, W. M. Hartshorn and H. N. Moeller (*Arch. Pediatrics*, 1914, xxxi, 586) conclude that there is not a universal endorsement of pertussis vaccine. A variety of vaccines are being used without definite knowledge of the bacteriology of the individual cases treated. There is a striking lack of negative reports. Apparently the vaccine is harmless in uncomplicated cases. There has been established no definite standard for dosage or for treatment. The dosage generally used has been apparently too small. The course of the disease in the majority of cases reported has not been much under six weeks. Its value as a prophylactic agent is still undetermined. It is generally conceded that the earlier the treatment is given the better the result. The vaccine treatment is worthy of a more extensive trial. Conclusions drawn from the treatment with vaccine of eighteen of the writer's own cases of pertussis are that a certain number of cases will respond favorably to a commercial vaccine. Where a commercial vaccine has not proved successful it would seem desirable to try an autogenous vaccine. The initial dose should be at least 50,000,000 in older children, and this may be doubled at subsequent treatments up to 400,000,000 at five-day intervals. Further observations regarding dosage are indispensable. A certain number of cases will not respond favorably to a vaccine, and in those it should not be continued after a trial of four doses. The relative value of the combined vaccines as compared to the single culture vaccine is undetermined. In that the improvement in a few cases was immediate and striking, it seems fair to suggest, but not to recommend, its use.

Without giving statistics, S. J. Meyers (*Pediatrics*, 1914, xxvi, 450) says that results show that if administered as a prophylactic agent, pertussis vaccine prevents development of the disease, provided the injections are given sufficiently early. Administered early as a curative agent the combined vaccine, which contains Bacillus of pertussis, staphylococcus pyogenes aureus, streptococcus pyogenes, micrococcus catarrhalis, and Bacillus influenzal, not only lessens the severity of the paroxysms but shortens their duration. Even late in the disease the combined vaccine treatment is worthy of trial, since without this treatment the disease may be much more serious. Complications, which have been so frequently observed under the older methods of treatment, do not occur when the combined vaccine method is employed.

Use of Blood Serum of Immunes in the Treatment of Malignant Scarlatina.—W. S. Barker (*Arch. Pediatrics*, 1914, xxxi, 599) records four cases of malignant scarlatina treated by hypodermatic injections of blood serum of immunes. Three of these recovered. In the fourth case the treatment was begun late and the serum was obtained from a convalescent case of questionable mild scarlatina. The serum was given in doses of from 1½ to 6 drams, the total in one case being 1 ounce and 5 drams. In a few isolated cases attempts have been made to combat the severe type of scarlatina with human blood serum. The German clinicians have made a number of reports of results which vary but little from what is offered in this paper: Huber, Blumenthal and von Leyden reporting favorably, while Rumpel, Scholz and others do not. The blood made use of in those reported cases seems to have been taken altogether from convalescing scarlatina cases, while in the cases here reported the blood is preferably taken from an immune a long time after having had the disease. What was apparently the most positively effective serum used came from a mother who had had severe scarlatina some years before; the least effective, if effective at all, from a brother, who was just able to get about.

The "Jaw-winking Phenomenon."—More than seventy cases of associated movements of the jaw and upper eyelid have been recorded. To these E. A. Cockayne (*Brit. Jour. Child. Dis.*, 1914, xi, 352) adds one in a baby first seen at six months of age. When she was about a month old, it was seen that the right eyelid went up and down as the baby sucked at the breast. There is a slight ptosis of the right upper lid. As far as one can tell in so young a baby, voluntary movement of the levator is good, and also of the other ocular muscles. The pupils are equal and react to light; there is no facial asymmetry, and no difference in size of the tarsal plates. As the baby sucks the right lid is raised synchronously with the movements of the jaw so that a little sclerotic is shown each time above the right cornea. As the jaw is moved away from the side of the lesion, as in grinding the teeth, the lid is raised. An almost imperceptible lateral movement is sufficient. The left lid is not moved, and the right eye itself remains stationary. Slight sucking movements produce no movement of the lid. When the baby yawns or laughs the lid is retracted to an extreme degree and shows a large extent of sclerotic. The movements are diminishing in frequency and in extent. There is no history of a similar condition or of ptosis in the family. Reviewing the other reported cases, the writer says that the condition is evidently, to a certain extent, familial and hereditary, as one would expect, since it is probably merely a special form of congenital ptosis or ophthalmoplegia externa, both of which are, in certain instances, familial, and in others very strongly hereditary.

Phlyctenular Ophthalmia.—S. Theobald (*Jour. A. M. A.*, 1914, lxiii, 566) states that the evidence adduced in support of the doctrine that phlyctenular ophthalmia is a tuberculous or pseudotuberculous lesion is far from convincing. The frequency with which the subjects of phlyctenulosis give a positive reaction to diagnostic tuberculin tests is of little significance in view of the fact that the same tests show a scarcely smaller percentage of positive reactions in healthy persons. There is excellent authority for the contention that "until some responsible observer has demonstrated the presence of the tubercle bacillus in an extended series of phlyctenules," or, at least, until it has been shown to be sometimes present, the assertion that the affection is, in any sense, tuberculous is without warrant. In the present state of our knowledge of the etiology of phlyctenulosis, the employment of tuberculin as a therapeutic agent in this affection is unjustifiable, not only because the ill-considered use of tuberculin is capable of doing much harm, but also because the clinical evidence shows pretty clearly that, if it is not actually harmful, it surely is not helpful. Definite clinical signs of the existence of tuberculosis, apart from the ocular inflammation, may justify the administration of tuberculin, but even in such circumstances the effect on the eye could be only indirect. As phlyctenulosis is essentially a disease of childhood, and the typical cases occur not in adult life, but in children, it is from the study of these cases that trustworthy conclusions as to the etiology of the affection are to be drawn. The study of these childhood cases shows, from the almost constant association of facial eczema with the ocular inflammation, that phlyctenular ophthalmia, as was formerly very generally held, is an ocular eczema, due, for the most part, like the facial eczema, to intestinal intoxication, and that tuberculosis is seldom, if ever, an etiologic factor.

Bacteria Found in Milk Heated to Various Temperatures.—This study of Baltimore milk is presented by W. W. Ford and J. C. Pryor (*Johns Hopk. Hosp. Bull.*, 1914, xxv, 270). They say that, as was first pointed out by Flügge, milk always contains the heat-resistant spores of aerobic and anaerobic bacteria, which, by their development, can give rise to disagreeable and unwholesome changes in milk, converting it into an undesirable if not a dangerous article of diet. These changes take place in milk heated to any temperature from 65° C. to 100° C. and kept at any temperature from 22° C. to 37° C., but not at that of the ice box, 4°–6° C. The spores of the bacteria causing these changes survive in milk for long periods of time on ice and can initiate the same changes in milk kept on ice when transferred to higher temperatures. There is a danger zone in the heating of milk which may be described as ranging from about 65° C. to 85° C. in which milk will never clot normally. Below this temperature heated milk may clot normally. Above this temperature milk will either clot or slowly peptonize. The problem of pasteurization of milk must be worked out on the basis of the changes which occur in milk heated to 60°–65° C. and the result may depend upon the original character of the milk, upon local bacterial infections of milk, on the character of the stables in which the milk is first obtained, upon methods of preservation or upon unknown factors. Further investigation alone can determine these points. With our present knowledge as to the difficulty of getting milk free from pathogenic organisms the safest milk is that which has been boiled for a time varying from ten minutes to half an hour and then preserved on ice. In such milk the organisms giving rise to explosive and putrefactive changes are destroyed, while the organisms which remain usually coagulate the milk or coagulate it and then peptonize it. Rarely they peptonize it without coagulation. While these bacteria may give rise to severe derangements of metabolism in children, and even to disease, as Flügge maintains, this has not yet been clearly shown clinically. Danger from them may probably be almost entirely eliminated by keeping the milk on ice from the time of boiling till the time of use. Milk heated to any temperature from 60° C. to 100° C. must be kept on ice, since heated milk is far more apt to decompose than raw milk.

Presence of Spore-bearing Bacteria in Washington Market Milk.—From the study of over fifty samples of Washington market milk representing fairly accurately the different kinds of milk sold in the city, J. C. Pryor (*Johns Hopk. Hosp. Bull.*, 1914, xxv, 278) confirms Flügge's original observation as to the presence of spore-bearing bacteria. In his experience the most important anaerobic species is *Bacillus aerogenes capsulatus*, which he believes to be universally present. Aerobic spore-bearing bacteria are also found in practically all samples, such organisms belonging in general to the group of gelatin liquefiers. Such species do not develop normally in raw milk nor in the milk sold in Washington as "pasteurized," only the ordinary lactic acid bacteria being found. All these spore-bearing organisms have a profound effect upon milk and when their development is not hindered by the lactic acid bacteria will produce changes of decomposition and putrefaction, rendering the milk unfit for food. How far they play a rôle in clinical conditions, especially in children, remains to be proved.

Primary Pulmonary Actinomycosis in a Child Aged Ten.—About four weeks before admission the boy of ten years whose case is reported by F. Huber and S. Berkowitz (*Amer. Jour. Dis. Child.*, 1914, viii, 113) was struck on the chest by a man, with sufficient force to give rise to considerable soreness on the right side and pain, causing him to complain for a few days. Two weeks later he was suddenly seized with high fever, headache, anorexia, prostration, and vomiting, the latter continuing for three days after the onset. On the fourth day of the illness an unproductive cough developed and was soon followed by a thin brownish expectoration which afterward became greenish and fetid, and was later accompanied by dyspnea. Three days before admission he began to show evidences of restlessness, drowsiness and incoherence, which increased. There was marked induration of the anterior and lateral aspects of the right side of the chest, particularly below, but no evidence of local inflammation, increased local heat or deep-seated fluctuation. A röntgenogram disclosed a dense white shadow occupying the upper three-fourths of the right pulmonary field, which was interpreted as fluid—perhaps a lung abscess or a sacculated empyema. The chest was aspirated in the sixth right interspace in the midaxillary line and creamy greenish yellow, tenacious and very foul-smelling pus was found. Thoracotomy was performed and a pint of thick, creamy pus was evacuated. Death occurred a week later. Autopsy showed a gangrenous right lung containing ray fungus. A thorough search for other foci indicated that the disease was of primary origin in the lungs. At no time was the ray fungus found in the sputum or pus.

Casein in Infant Feeding.—A. W. Bosworth and H. I. Bowditch (*Amer. Jour. Dis. Child.*, 1914, viii, 120) describe a method for preparing dry powdered paracasein for use in infant feeding. It is shown that this paracasein is very easily digested and absorbed, and judging from the elimination of creatinin and creatin, it seems possible to maintain normal nitrogen metabolism by its use in infant feeding. It is shown that disturbances (fever, toxic symptoms, etc.) do not result from feeding this paracasein in exceptionally large quantities for seven days, even if fed with only the small amount of whey carried in 68 c.c. of 32 per cent. cream. The method of preparation is as follows: Fat-free milk is curdled by the addition of rennin and when the curd has become so firm that it will make a clean break when the finger is thrust diagonally into it and then lifted up, divide it into small pieces, remove the whey and wash several times with water. If the curd is obtained from a dairy, or for any reason becomes matted together, it must be broken up and then passed through a meat chopper. The finely divided curd is now placed in a large vessel such as a cheese vat or a clean wash tub, and to it is added 5 volumes of water for every volume of milk used to produce the curd. The curd is now dissolved by adding about 10 c.c. of concentrated ammonia water for each quart of milk used. More or less continuous agitation will be necessary. After complete solution the paracasein is precipitated in the following manner: Take 2.5 c.c. of glacial acetic acid for every quart of milk used and dilute it with 25 volumes of water. Add this diluted acid to the solution of paracasein, a few cubic centimeters at a time, and with constant agitation. This will precipitate the paracasein. An excess of acid will redissolve the precipitated paracasein which should separate out as a large flocculent precipitate quickly settling to the bottom of the vessel. If a very fine precipitate is formed, which does not settle rapidly, it is an insoluble calcium salt of paracasein and the addition of a little more acid will change it to the desired form, free paracasein. More or less acid than the amount specified may be required to give the proper precipitate, depending on the condition and age of both the milk and the curd and on the amount of ammonia used to dissolve the curd. After the paracasein has settled and the supernatant liquid has been removed, it is washed several times with water and then redissolved, using the same volume of water as before, but using caution at this point so that an excess of ammonia is not added.

After complete solution the paracasein is again precipitated with dilute acetic acid and washed as before. In order to secure practically ash-free paracasein it will be necessary to make six or seven precipitations. Two precipitations, if properly made, will give a fairly good product. After the final precipitation and washing the paracasein is placed in a linen bag and allowed to drain for two hours. It is then transferred to a mortar and triturated with 95 per cent. alcohol. After allowing to settle, decant off the alcohol and again triturate with a fresh portion of alcohol, repeating two or three times. The dehydration is completed by allowing the paracasein to remain in contact with a large volume of 95 per cent. alcohol for an hour or two. This alcohol is removed by decantation and filtering through the linen bag and if desired the bag and its contents may be placed in a press to remove most of the remaining alcohol. The preparation is now made to pass through a 20-mesh sieve and finally dried at a temperature between 80 and 90° C. With proper care as to technic the final product will be a fine powder. If a powder is not obtained it can be secured by grinding in a coffee mill. If grinding is necessary the material should be placed in the drying oven again in order to remove any alcohol which might be held inside the larger particles.

Presence of Lactic Acid in the Urine in Cyclic Vomiting of Childhood.—F. P. Underhill and H. M. Steele (*Amer. Jour. Dis. Child.*, 1914, viii, 120) report a case of cyclic vomiting showing one feature hitherto unrecognized, namely, the presence of lactic acid in the urine. The significance of lactic acid in the urine is not well understood, although its presence in the urine in eclampsia, pernicious vomiting of pregnancy, phosphorus poisoning, etc., is well known and its appearance may probably be taken as an indication of disturbed carbohydrate metabolism either induced by the pathological state itself or as a result of an accompanying inanition. Its meaning with respect to the etiology of recurrent vomiting of childhood must be left, therefore, for future investigation.

Middle Ear Complications of Measles in Immigrant Children.—Judging from 1769 cases of measles observed at Ellis Island, H. C. Cody (*Amer. Jour. Dis. Child.*, 1914, viii, 147) states that suppurative otitis media occurs as a complication of measles in immigrant children; that is to say, in children subject to unfavorable hygienic surroundings both at home and on board ship, in nearly 20 per cent. of cases. Mastoid involvement is not common, and the disease yields to treatment comparatively readily. The disease is essentially subacute (rather than chronic) and the apparent results as affects hearing are good.

Tuberculosis of Lymph Glands in Children.—A. P. Mitchell (*Edinb. Med. Jour.*, 1914, n. s. xiii, 209) emphasizes the possibility of different results being obtained according as the tuberculous material under investigation has been removed at autopsies or during life; and that the importance of the relative frequency of the bovine and human types of infection at the different age-periods has not been sufficiently recognized. In a series of autopsies on twenty-nine children under twelve years of age dying from all causes, cultures were isolated from the cervical, bronchial or mesenteric glands of twelve and tested as to their cultural characters and virulence for rabbits. Eight cases yielded cultures of human tubercle bacilli; in four cases they were of the bovine type. Human tubercle bacilli were isolated from seven tuberculous children and one not apparently tuberculous child. Of eighteen children who presented at autopsy no visible lesions of tuberculosis, tubercle bacilli were demonstrated to be present in a single case in the bronchial glands of a child aged four years; the bacilli were of the human type. Eighty consecutive cases of tuberculous cervical glands in children under twelve were investigated after operation. Of the eighty cases, the bovine bacillus was present in seventy-one instances (88 per cent.) and the human bacillus in nine (12 per cent.). The maximum incidence occurred during the second year of life. Among the children harboring the human bacillus the opportunity for human infection could, as a rule, be established. As regards the bovine cases, it seems more than a coincidence that in not a single case was there a history of pulmonary tuberculosis in other members of the family. In sixteen cases, however, one or more of the children in the respective families were affected with various forms of surgical tuberculosis. Out of eight cases of tuberculous peritonitis or tuberculous mesenteric gland disease, seven proved to be of bovine origin, and one of human origin. All the children were under twelve years of age, and had been fed on raw milk. An inquiry recently carried through showed that of 406 samples of mixed milk collected from the same number of milk shops in the Edinburgh milk supply district, eighty-two samples (20 per cent.) contained tubercle bacilli. The writer believes that the results of inoculations with autopsy material, so far as they go, furnish evidence that in cases of fatal tuberculosis in children the human bacillus is the main contributor to the mortality rate. Having demonstrated that a considerable proportion of the tuberculosis affecting children in Edinburgh and district is of bovine origin, more particularly that which affects primarily the mesenteric and cervical glands; that the milk supply of the same area is frequently infected with bovine tubercle bacilli; and having demonstrated that a certain number of deaths occur from this bacillus, the author is of the opinion that bovine tuberculosis can no longer be considered a negligible factor in respect to the spread of tuberculosis among children, more especially since unsterilized cows' milk in Scotland is a vehicle by which tubercle bacilli must very frequently be introduced into the bodies of children. He maintains that the campaign against tuberculosis must include the bovine sources.

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ORIGINAL COMMUNICATIONS

THE RESOURCES FOR GIVING PRENATAL CARE.*

BY

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Introduction.—We are gathered here this afternoon to consult together how best to protect and safeguard the most valuable, the most helpless, and yet the most appealing creature in the world—the human infant.

To protect the baby we must protect its greatest friend, its mother. The baby's greatest resource is the mother instinct which is instantly aroused by the baby's appealing cry, his mightiest weapon.

Probably every one here knows more or less intimately what nursing and care of a baby means, but some have come to learn, at least more definitely, just what is meant by prenatal care, how it may be given, and what it may accomplish.

Outline.—I propose in this paper to define prenatal care and to describe exactly how it is given to a patient in one of our Boston clinics, showing what it means to the patient, the doctor, the nurse, and the social worker. Then I shall review the means available for giving this care in a town, a small city, and a large city, Greater Boston. I must leave to others the difficult problem of rural care.

I will next sketch what is needed to make this care reasonably available for those of limited means in Boston, adding suggestions for an ideal scheme.

Finally I wish to make clear what the problem is which the

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community faces to-day in order to make available to the prospective mother of the crowded city districts reasonable prenatal and obstetric care.

Definition.—What is prenatal care? It is not the popular conception, as I am told by one prominent physician, preventing feeblemindedness in the child, but it is conserving the health and strength of the prospective mother; it means foresight and forehandedness during pregnancy. A common practice among the unenlightened or improvident, who blindly hope all is well, is to call at the last minute a doctor or midwife to meet unprepared any emergency. Prenatal care substitutes for this haphazard way the following procedure:

Procedure in a Prenatal Clinic.—The doctor sees the prospective mother as soon as she suspects that pregnancy has occurred. He learns the history of past illnesses and confinements and her present symptoms. He makes a careful physical examination of the teeth, lungs, heart, blood-vessels and blood pressure, of the abdomen with estimate of the period of pregnancy, the size and position of the child, if near term, the rate and location of its heart, and careful measurement of the mother's bones to make sure no obstruction to birth is present. Swelling of the feet and legs is noted, and a test of the kidney function is made. The facts thus gathered form a basis on which to predict the outcome.

Such prediction is the highest point of obstetric science, and to be reliable, must be made by a physician familiar with the experience of the past. Our medical fathers classified millions of cases and studied thousands of abnormalities. (See Breus and Kalisco.) The physician must be prepared to use this knowledge. The judgment of such a man must be balanced by the experience of successfully meeting the many problems and emergencies of obstetrics. How does this help the mother? Here is one example: Prof. Kerr of Glasgow, a few years ago, in the Maternity Hospital of that city, by using more exact methods, such as careful study of the pelvis and the size of the child's head, was able to reduce the number of forceps operations, where the pelvis was mildly contracted, from 91 to 47 per cent., thereby reducing the infant mortality in such cases from 18 to 2 per cent., and the infant morbidity from 30 to 4 per cent. Similar results have been obtained in this country by Williams at the Johns Hopkins Hospital.

With the outcome thus intelligently predicted the mother is confidently instructed and the nurse is put in charge of the case, with the doctor as consultant to guard against any abnormal condition which may yet develop during pregnancy. The nurse visits the home at intervals of not over ten days. At the first few visits home conditions are seen and instructions given for personal hygiene in diet, baths, clothing, fresh air, sleep, and exercise; *i.e.*, how best to conserve her strength for the good health of the baby and for the physical strain of labor and nursing. Later, necessary preparations for the coming of the baby are assured with every precaution against infection to the mother and baby. At all visits the mental and physical condition of the mother is critically observed, a urinary test is made, and the cooperation of the whole family is solicited.

While in many cases this preliminary study and care may seem a needless precaution, the saving of possibly four or five lives in every hundred cases, the avoidance of danger in ten to twenty more, and the relief of suffering and discomfort in perhaps forty or fifty would seem to justify the effort. The more intelligent the woman the more reassured and grateful she is. The dangerous advice of the gossiping neighbor is apt to be less heeded. Experience shows that the tactful nurse is welcome in the home and her opportunity for good is great. It would be difficult to exaggerate the value of these visits made by an efficient, sympathetic nurse to certain prospective mothers. Seldom will a nurse's personality tell more than in some of these friendly visits. Her social service training will often be invaluable in meeting the situation.

To the social worker the field is new and limitless. The problems of maternity and its relations with society are enormous. Scarcely a pregnant patient comes to our clinics to-day who is not worried by some social difficulty added to her physical burden. Such problems as illegitimacy, drunkenness and desertion are frequent, while improvidence, unemployment and a too small budget are the usual state.

The settlement house as the center of a district may often do very effective prenatal work. It is not difficult to obtain the services of a young, capable, well-trained obstetrician for the medical work. Their intimate knowledge of the homes, together with the confidence placed in them by the parents, enables these social workers to wisely advise prospective parents in these matters. Miss Strong of the South End House in Boston has paid particular attention to the father in this respect. She says, "We try to make him feel that the baby is to be a veritable social investment in which he *must* be willing to put thought, time and money. If his sense of protective watchfulness can be stirred to conserve the strength of the mother for the good of the child, then he has dignified himself anew."

To sum up, prenatal care, then, is *preventive medicine as applied to obstetrics*, *i.e.*, the utilization of every known means to keep the prospective mother well and strong, to foresee and forestall dangers, to intelligently provide for confinement. This may be merely proper care in the home at a minimum expense for the normal case, or the best skill available in a hospital for averting tragedy. Preventive obstetrics thus includes a wide knowledge of the anatomy, physiology, psychology, and sociology of the patient.

To obtain the greatest efficiency in prenatal care there must be cooperation of the various scientific laboratories in the medical school to further our knowledge. The medical societies and journals should disseminate this new authorative knowledge. For example, an important and live subject is the thorough investigation of "twilight sleep," its safety or danger; if valuable, the best, simplest and safest method of obtaining it. The hospitals must also cooperate by providing a welcome and ample care for the doubtful and dangerous cases. The State and Municipal Health Boards, Milk Stations, and social forces, both public and private, should cooperate to make its application to the community possible, as well as the efforts of patient and family, to the end that motherhood may be safe, successful and happy.

I wish here to describe an experiment designed to put this into actual practice.

From April, 1909, a committee of the Woman's Municipal League of Boston, under the leadership of Mrs. W. L. Putnam, has in five years given prenatal nursing care to 1512 women in Boston. The results have been truly remarkable. Not one death occurred among these mothers during pregnancy, and but nine maternal deaths at confinement (0.6 per cent.), in the full five years. In the last three and a half years no miscarriages. Threatened eclampsia, sixty the first year, two the last year. Only four cases of real eclampsia have developed during this five-year period. The stillbirths, including premature births, were for two years less than half that of the rest of Boston. Infant deaths. Total number under one month of age, 43 or 2.8 per cent. while Boston's rate in 1913 was 4.3 per cent. Percentage of breast-fed babies, 84.7; percentage of mixed feeding, 4.5; total 89.2 per cent.

After this five-year experiment the committee rests satisfied that prenatal care by the nurse visting in the home at intervals of not over ten days has demonstrated its efficiency in relieving suffering and preventing danger and disease in the mother, and rendering maternal nursing more successful, thereby reducing infant mortality.

Proceeding from this convincing demonstration the committee, backed by an advisory board of experienced obstetricians, have undertaken the next step; that is, the more difficult problem of medical supervision during pregnancy and adequate care at confinement. Two dispensary prenatal clinics are now under the committee's supervision, one at the Peter Bent Brigham Hospital, the other at the Maverick Dispensary in East Boston. The committee stands ready to develop more of these prenatal and obstetric clinics as demand is made.

These clinics are under the direct supervision of an obstetrician. They use as a basis to work with not the trained or untrained midwife, but the young obstetricians who are graduates of some maternity hospital and the nurses of the Instructive District Nursing Association.

The work is gradually being standardized. For example, no patient before confinement may be visited by a nurse more than twice unless she has been examined by a private physician or by the obstetrician at the clinic. Thus the medical responsibility is carried by the doctor, which the committee feel is essential for the best results. Two simple examples will show the importance of an early medical examination. (1) A patient in South Boston was found after labor had progressed some time to have a too small pelvis for successful labor. A difficult operation resulted in the death of the mother and child. Had an early examination been made Cesarean section in a hospital should have saved hours of terrible suffering and both lives. (2) The District Nurse made several visits giving careful instruction to a patient registered at a certain hospital, but not examined. Severe symptoms developed. Examination then disclosed the fact that the patient was not pregnant.

Such a system is designed to use the ever increasing medical and nursing knowledge and skill available in any community and to stimulate this to its highest efficiency. Results are not yet sufficiently numerous to warrant generalization.

For such an organization semi-free and free hospital beds must be available. We know that at any time during pregnancy the case may demand major surgery. Obviously the expense of this cannot be wholly met by the ordinary family of the crowded districts, nor even by those of moderate means.

The expense to the patient for care in these clinics is $10.00 in

East Boston, where the dispensary guarantees to the obstetrician $5.00 per case, while at the Peter Bent Brigham clinic the doctor, after confinement, is allowed to collect $10.00 from the patient. The Instructive District Nursing Association receives $2.00 in East Boston, while in the Roxbury clinic $5.00 covers the whole nursing service, both prenatal and postnatal.

One thing we find helps out in both places. Many women are insured in a certain large insurance company. The obstetric nursing is then paid for by this company. I wish to raise the question of maternity insurance to include a reasonable fee for the physician and thus provide the means for efficient service. There may be some objections. There certainly are many advantages.

The Small City Problem.—Those familiar with our Transactions know what is being done in one of New England's smaller cities, Manchester, N. H., a distinctly manufacturing town. Here the medical society assigns certain physicians to care for poor women. These women apply to the City Mission, a central relief agency, and receive, if necessary, free medical, nursing and social care. The result is that the most active midwife in Manchester has moved to New York.

The Town Problem.—The small town problem has been similarly met in Brattleboro, Vt. Again a central agency cooperating with the doctors directs the nursing and household care according to the need. This has proven a very economical system by using expert nursing only when needed and less skilled workers under expert supervision when that care was safe.

The Large City Problem, Boston.—Medical Conditions in Massachusetts.—In order to understand the conditions of obstetrical service to-day in the crowded districts of Boston it is necessary to know a little of the general medical conditions of practice throughout the State of Massachusetts.

Briefly summed up, Massachusetts has undoubtedly many fine physicians, but Massachusetts has, nevertheless, the distinction of having, with three other states, the lowest legal standard of admission to practice in this country, which, by the way, is far below the average in most European countries. She has the oldest registration law in the country because the legislature has refused all attempts to raise the standard. Certain special interests always oppose any advance, the public are ignorant, and the medical profession, as a whole, indifferent.

Candidates *without degrees* may here obtain a license to practise and many do. Candidates from the low-grade schools cannot be refused admission to the examinations for license. Thirty-two states including Porto Rico are refusing to examine them. The result is that Massachusetts is overstocked with physicians. The 1910 census shows one physician to every 541, in Boston one physician to every 357 inhabitants, while perhaps one physician to every 1000 inhabitants is sufficient. Massachusetts, with a few other states, has become the *dumping-ground* for *poorly-trained physicians.* Such poorly-trained physicians gravitate to sections of least intelligence. The crowded immigrant districts contain more people least able to judge the caliber of a doctor and least able to employ a good one. Here "business competition" is keen, infant lives are worth little, dollars are scarce. Under such conditions is it surprising that the poorly-trained doctor has, in some cases, outstripped the midwife in producing infant mortality?

Few people even in Boston realize the magnitude of our population. Boston proper has a population of 752,000 with approximately 20,000 births in 1913. Metropolitan Boston has 1,500,000, which in twenty years will be, it is estimated, 2,000,000. Boston within a fifty-mile radius has 3,500,000 (next in size to New York). Massachusetts receives approximately 100,000 immigrants annually. These figures suggest the magnitude of our problem. To provide obstetric care for this population Boston has the following hospitals, dispensaries and other agencies in the field.

The Boston Lying-In Hospital in 1913 cared for 2672 cases.

The Homeopathic Hospital in 1913 cared for 1062 cases.

The St. Elizabeth Hospital (number of cases not obtainable).

The New England Hospital for Women and Children in 1913 cared for 563 cases.

Besides these four hospitals with maternity wards there are nine other hospitals caring for a few cases each in Boston proper and eleven hospitals caring for 972 in Greater Boston.

Three dispensaries not directly connected with hospitals having maternity wards cared for 387 cases. They are:

Mt. Sinai Hospital Dispensary. Out-patient Dept. 261.

Peter Bent Brigham Hospital in Roxbury, 90.

Maverick Dispensary in East Boston, 36.

The prenatal nursing is all done, with the exception of eighty-three cases in 1913 cared for by the Boston Board of Health, Division of Child Hygiene, by the Instructive District Nursing Association giving home care to many of the hospital and dispensary cases as well as to many of those under private physicians, numbering 1966 prenatal cases in all in 1913. This nursing association is recognized as one of the most efficient nursing organizations in the world to-day. I wish here to offer my respects to the nurses and officers of this organization for their enthusiastic spirit which has lent inspiration to this work. As was pointed out last year at the State Conference of Charities the middle class do not, as a rule, benefit by using hospitals and dispensaries, but receive perhaps the poorest obstetric service.

As a result of this survey we may estimate that roughly one-half of our mothers in Boston secure what may be termed reasonable care. The other half, including the large and valuable middle class, do not now receive such reasonably safe care.

Private Practice.—In private practice to day the patients are learning to expect thorough prenatal care. But much of the maternity care is still given by the general practitioner, often untrained in this branch of surgery. One friend of mine among this number of general practitioners serves as an example. He tells me that he dislikes this work and could afford to give it up but for the fact that it gives him his hold upon the family. If this is still so among the doctors of the well-to-do, it is even more the rule among the ever-increasing number of doctors of the poorer districts who are struggling for existence.

Some physicians will find it useful and time-saving to have at least certain of their private patients visited by a nurse trained in giving prenatal care. The Household Nursing Association of the Woman's Municipal League of Boston are trying the experiment of furnishing obstetric nursing in the home for $35.00 a case, intended to serve at cost those of moderate means.

To certain intelligent mothers Dr. Slemons' recent book, "The Prospective Mother," may prove most helpful. One more important resource is thus suggested. This is the rapidly increasing *literature* on prenatal care. This literature is of three classes:

1. That intended for promotors or organizers of this work.
2. That intended for workers.
3. That intended for mothers.

A list of such literature is appended, together with the outline of a suggested plan for organizing prenatal work in a local community.

One other resource I wish particularly to call to your attention. Each year the Boston Lying-In Hospital graduates, after a six months' service, eight or ten House Physicians who have had at least a practical introduction to obstetrics and its problems. This number, with the men trained in other maternity hospitals, provides more than a sufficient number of trained men in the community to efficiently care for these thousands of cases. Yet in the present state of affairs they may not do this. Why?

1. The public is ignorant of their value.

2. The extra training which these men possess fits them for future successful practitioners in the well-to-do parts of the city where they, therefore, settle. Here they pass through a waiting period of idleness, eager to do obstetrics, but unwilling to jeopardize their future practice by living in the needy districts.

The Problem.—The facts as I see them to-day in Boston are these: First, a large number of prospective mothers in our crowded districts are now wretchedly served, with the exception of the comparatively few private, hospital, and dispensary cases, by poorly equipped doctors working under the pressure of financial necessity, and a comparatively few careless, ignorant, often dirty midwives. Second, a sufficient number of young doctors, well-trained and eager for this work, striving, however, for a lucrative practice in the wealthy sections of the city where much of the obstetrical care is still given, again because of financial necessity, by the family physician. Conditions in Boston then show the large need on the one side, and the knowledge and skill ready on the other, separated only by financial necessity.

Why have we a low standard of obstetric training in Massachusetts to-day? Obstetrics is one of the important subjects in which candidates are examined before a license to practise medicine is granted. I believe the Board of Registration in Medicine in Massachusetts is convinced that the present examination is not now and cannot be made, under our present laws, a sufficient test to insure knowledge, experience and judgment in this department of medicine so vital to the community. This is the fundamental trouble, poorly trained doctors.

For the prevention of typhoid fever the State and City Health Boards are active and even the legislature *sometimes* makes laws for this purpose, such as those intended to secure a pure milk supply. Why should they not take precautions to prevent unnecessary deaths and sickness in the baby supply?

One intelligent milk producer has traced the difficulty of selling certified milk in Boston at a reasonable profit to the ignorance and indifference of the physicians who do not even themselves buy certified milk and who seldom urge its safety to their patients. Those working at or near the source of the baby supply in Boston are convinced that here again the poorly trained doctor is the greatest factor for the production of dead babies and weak babies who die in the first month of life when the infant mortality is highest. This is a sad truth for a *doctor* to confess, but could a better thing be done for the profession than to have the standard of medical efficiency raised to such a point that the name of "doctor" should universally deserve its old-time ring of confidence?

Prenatal care may be the first step in getting good obstetrics, or it may be nullified by poor obstetrics. For efficiency the two are interdependent and inseparable. To those familiar with life in the crowded districts of our cities the problem of better obstetric care is only too evident. The workers in this field know that it is a vital family problem with the family little prepared. Successfully met it means a healthy strong mother able to nurse her baby. A nursed baby means another strong healthy citizen, a contributor to the State. Failure to meet the obstetric problem results, if not in two deaths and disaster to the family, at least in partial invalidism of the home-maker, the weakening of the infant's food supply. Inability to nurse means a weakened child, increased danger from disease, expense to the family, and too often a dependent on the community.

At least half of the infants who now die in the first month of life can be saved by applying our present medical knowledge and skill. New Zealand has already demonstrated this. Does this mean that the weaklings can be raised just above the death line? No, it means that the lives of thousands of strong, healthy babies can now, by preventing disease, be saved. It means more. It means that if our medical knowledge could be applied in a reasonable amount to the needy communities, a far greater number of babies, now just above the death line, could be made stronger and more resistant, and meet successfully the high mortality of environment just ahead, where the milk station is already solving that problem. It means a stronger race.

Prenatal Care a Public Health Problem.—Prenatal care evidently is fairly to be considered a part of preventive medicine and should be given all the rights and privileges of its fellows. The deaths of mothers and children are as preventable as those from typhoid fever, and are far more numerous. Does it take much imagination to picture National, State and City health authorities laying plans for the prevention of death, disability, and weakness from inefficient care during pregnancy and confinement?

Is it not conceivable that some day we may advance to the point of civilization where notice of expected babies may be required by the health authorities in order that these authorities may receive assurance that reasonable provision is made for the safety of mother and baby, and that preventable danger to valuable citizens may, by appropriate means, be foreseen and avoided?

Nowhere could the State or City spend money to better advantage than in safeguarding her mothers. One need not be a Socialist to believe this. One need not be an extreme Religionist to believe this. One may be only a reasonable citizen with a kindly sympathetic heart toward one's neighbor and an eye for the general good of the community, like most of us, to believe it.

There is a campaign on in Massachusetts for more and healthier cows with which I have entire sympathy. But the time, thought, effort and money spent on this should be in due proportion to that spent for healthier mothers and more live, strong babies.

Pittsburg, I am credibly informed, has recently been given $3,000,000 to equip a maternity plant consisting of a modern hospital with local dispensaries and all the necessities for a complete service to the city. Boston, with a population greater by one-fifth, should have no less to care properly for its mothers. I am convinced that our greatest need in Boston today is a large maternity hospital as a central home for obstetrics. In touch with this central hospital, local dispensaries or health centers, doing prenatal work, bringing dangerous cases to the hospital, and caring for normal cases in their homes.

An Oliver Wendell Holmes Hospital.—It is the privilege of young men to dream dreams. As I am still on the young side of forty I will claim that privilege. This is the story of my dream which I have dreamed these many times the last few years as I have seen the great needs of Boston's motherhood. In 1843 Oliver Wendell Holmes, poet and professor of anatomy here at Harvard and a wise physician, wrote, "The disease known as puerperal fever is so far contagious as to be frequently carried from patient to patient by physicians and nurses." This was the logical deduction of a keen observer with a clear, analytical mind, one of the really great discoveries of the past century. A few years later Pasteur confirmed this discovery by demonstrating the germ called streptococcus to be the organism transmitted by doctor, nurse, and midwife which produced this dread disease, which, in consequence, today, like small-pox, is only found where ignorance and carelessness prevail. This great discovery by Holmes and its confirmation by Pasteur set in motion a new idea of preventive medicine, *surgical cleanliness*. The application of this idea in obstetrics has been the greatest factor, ever since, for safety and comfort to the women of the world.

Boston to-day needs a large hospital established on broad, generous lines to be a home for obstetrics. I dreamed that an Oliver Wendell Holmes Hospital, offering all the modern methods of safety to the women of the world had been established as a fitting monument to commemorate Boston's greatest benefactor of women; that the women of Boston and Massachusetts, and of New England, had appropriately united in giving such an obstetric home, supported by public subscription, governed on broad humanitarian lines for the benefit of the public, calling to its head the best obstetrician obtainable in this country or abroad to assure the highest standards.

My dream ran on; the benefit to the patients of this hospital, closely affiliated with a medical school, showed that teaching and learning had advanced the science and art of obstetrics so rapidly that there were attracted to Boston many medical men from all over New England, in particular, to refresh and advance their knowledge in obstetrics. Also the prestige of the Holmes Hospital had opened the way through Boston's excellent facilities for medical research, such as the Carnegie Laboratory of Nutrition, the anatomical, physiological, chemical and embryological laboratories of the Harvard Medical School, had opened the way, I dreamed, to broad, scientific studies along modern lines in obstetrics, a much neglected field in the science of medicine to-day. Boston grasped this opportunity, and by developing such an obstetric hospital, soon ranked with the other obstetric centers of the world and thus gave to the women of Boston the safest and most efficient prenatal and obstetric service.

Again I dreamed that with a very democratic hospital to support and direct the work, prenatal and obstetric clinics were soon developed in connection with health centers in the crowded sections of our large city. The women of moderate means, the backbone of our civilization, found here in this hospital home of obstetric knowledge opportunity for safe and comfortable care within the limits of their resources. I trust that I may some day wake to find this dream come true.

In Conclusion.—1. The low legal standard of admission to practice attracts to Massachusetts men who could not enter practice in nine-tenths of the States of the Union. These ill-prepared men inevitably gravitate to the crowded districts. This is a fundamental difficulty.

2. A large maternity hospital with a broad and generous policy is Boston's greatest need in obstetrics to-day.

3. With the creation of such a hospital home for a base, the development of a network of prenatal clinics throughout the different sections of the city should be easy. The Dispensary, the Milk Station and the Settlement House as well as the facilities of other diversified hospitals could be utilized.

4. Where no medical students are available the recent graduates, with maternity hospital training, and the district nurses offer to Boston at least, and possibly to some other cities, the best hope for the development of a modern prenatal and obstetric service.

5. The comparative cost of such a service is probably no greater than that of establishing midwife schools with a system of license, inspection, and supervision. The results, I am inclined to think, will bring more satisfactory return in proportion to the energy, time and money expended.

6. How can the extra cost of such a modern service be met? Will *organization* and *cooperation* of present forces producing efficiency and economy help? Will *private philanthropy*, by experiments such as those the Woman's Municipal League are trying, help? Will the *Nation*, the *State*, and the *City*, by wise administration of health laws, help? Will the development of *maternity insurance*, private or state, help? If so, in what proportion and under what organization.

7. This association whose sole motive is the public welfare has among its members those best qualified to solve these problems from a national and international point of view. A heavy responsibility rests with us to make wise decisions and adopt a reasonable, farseeing policy.

CONSTRUCTIVE PROGRAM.

I venture to suggest a constructive program for those who wish to promote prenatal work.

1. For each township or city district a *local committee* of from fifteen to twenty enthusiastic women. Such an organization has proved highly successful in New Zealand.
2. Form a plan of the work.
3. Make a study of the already available means, as:
   a. Medical Society to furnish an obstetrician.
   b. District Nurses' Association.
   c. Milk Station.
   d. Charitable organizations.
   e. Churches on a broad basis of human interest.
   f. Hospital beds for dangerous cases.

4. Become familiar with the literature of:
    a. National Children's Bureau.
    b. New York Milk Committee.
    c. Russell Sage Foundation.
    d. State Agricultural College.
    e. Women's Municipal League of Boston, Committee on Obstetrics and Prenatal Care.
    f. Transactions of the American Association for Study and Prevention of Infant Mortality, and through them many other helpful literary contributions.
5. Estimate the needs of the individual community.
6. Form a Finance and Publicity Committee.
7. Solicit the cooperation of the Women's Municipal League of Boston, Committee on Obstetric and Prenatal Care.
8. Obtain literature for distribution to prospective mothers who may be able to read.

Examples of the literature are:

"Prenatal Care," "Birth Registration," "Baby Saving Campaigns,"—U. S. Children's Bureau.

"Mother's Baby Book",—State Board of Health of Indiana.

Seventh Annual Report of New York Milk Committee, 1913.

Transactions American Association for Study and Prevention of Infant Mortality.

Reports of Brattleboro (Vt.) Mutual Aid Association.

Leaflet of the Household Nursing Assn. Women's Municipal League, 6 Marlborough St., Boston.

Health Bulletin, Dept. of Health of Virginia, Oct., 1913, No. x, vol. v, Richmond Va.

"The Care of the Baby"—Dept. of Child-helping, Russell Sage Foundation, 100 East 22nd St., New York, N. Y.

"Before the Baby Comes"—New York State Dept. of Health, Division of Child Hygiene.

"The Prospective Mother," Dr. J. Morris Slemons—D. Appleton & Co.

"For Women Who are about to Become Mothers"—Leaflet, Board of Health, City of Boston, Division of Child Hygiene.

TEACHING OBSTETRICS.*

BY

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Education counts for something, even as does the air we breathe. It so counts for a great deal. Of itself it can of course originate or create nothing; cannot make, in the words of Chicago, "a ten thous-

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and dollar of a ten dollar boy." But it can make the most even of the ten dollar boy, make him honest coin, small change for any sixpence.

Considered in a broad biological sense education is of two kinds, the one consciously acquired, the other unconsciously. The unconscious education is by all odds, and for better or worse, the more essential, the truer education. The conscious education, on the other hand, the deliberate, so-many-hours per week pedagogy, teaching in its scholastic sense, is comparatively less important, and of much more flimsy stuff.

Nevertheless, far be it from me to decry teaching even in its narrowest application. It has its place, and a large preparatory place it is, in our modern life. And it is with this professional teaching that we who teach have chiefly to deal.

The chief concern of the teacher is, no matter what the subject, that his teaching be natural, productive, and scientific. Accordingly, he should be the living embodiment of the subject which he teaches, even if this subject be a dead language; for so, not only does he know his subject, but he thoroughly assimilates it, makes it part and parcel of himself. In this way his whole personality becomes, as it were, articulate. Of necessity he must be a clear thinker, a strong handler of detail so that the greater, the essential things, stand in his mind always high and clear, distinct from, the less. There is accordingly a right proportion, and a sense of humor. And now, if he teaches well, he must have a certain power of expression, a dramatic spirit to inspire his message; and with this, the selective insight to adapt his teaching to the separate individual—to the genius and to the dunce. And still as a teacher he will only half succeed unless in memory he can live again through the questionings and difficulties of his own adolescence. To teach the young (it is impossible to teach the old) he goes back and lives and thinks with the young, becomes one of them in their own special dwelling-place, their own immaturity of consciousness. For so only can close and productive communion between teacher and taught be secured; or, to use Samuel Butler's phrase, so only is the cross between them rendered fertile.

From all this it follows that the good teacher is born, that he cannot be made, and that he is not nearly so numerous as he professes to be. In reality he is the imposing negative of Bernard Shaw's invective that is so generally true: "Those who can, do; those who can't, teach." In any community he is, perhaps, the most useful citizen. While he may not create—creators are a small and select body, and stand of course apart—still he may almost recreate the younger generation. He is the university's or the school's greatest asset for he is the very school itself. He is the chiefest part of any necessary equipment.

One example—the opening lecture at the University of Edinburgh. One sees the amphitheatre with the young, crowded, careless faces, and hears again the clamor of it all. Then quietly the great teacher is ushered in, and steadily waits behind the little desk for the last shuffle of the settling feet, and the final flutter of the opening note-books. He is tall, and the eyes behind the big bowed glasses travel deliberately up and down the rows of faces, demanding silence. And they get it. "Gentlemen," and up comes the long index finger, "we begin to-day the study of Obstetrics. Parturition, the bearing of young, is a natural physiological process—identical in the countess and in the cow. You, gentlemen of the back bench, remember this "the countess and the cow." And they do remember it—you may be sure of that.

Now, whom shall our teacher teach? And how shall these, his pupils, be chosen? Heretofore, so far as I know, the choice of a profession, of the life's work, is largely a haphazard business. The boy falls more or less as dice are thrown from a box, into the church, the law, medicine, or the market-place. How trivial, inconsequent, and sporadic are the efforts made, for the most part, to help the boy in this, his great choice; how little is he studied, and the promise of his latent talents adjudged! Usually, I think, the momentous decision is left almost entirely to himself. And he, poor beggar, chooses the best he can among the shadowy mysteries which confront him. In all ignorance he stands before Pandora's box. Or, worse still, an arbitrary parent or impatient guardian impels him from behind with promise of gain or threat of disinheritance, unmindful so often that a wrong choice here is the veritable "tragedy of education." It seems to me they did not so much worse in the so-called dark ages where, as you remember, the boy inherited his trade or profession, followed without question in his father's footsteps.

Each one of us in this place, men and women alike, has endured, has passed through such an ordeal of indecision. In looking backward how the time of choice comes back to us! We remember the first vague unrest, the questionings of choice here and there, the faint voice of inclination, and the various influences round about, the sharp stroke of chance or change that thwarted our schemes, or finally decided us. I know a foot-ball scrimmage in November slush and a pleurisy therefrom that robbed our profession of a promising disciple in obstetrics, and made him instead, and quite rightly, a teacher of eugenics. So for the most part our great decision—the choice of a life-work—was made in this myopic, helpless, haphazard way.

It always seems to me that the wise teacher, especially in the preparatory schools, could be of no great service here. He could watch the boy and discover the promise of his gift; he might learn his inclinations and proclivities; study his adaptation to this thing or to that; teach the boy in this true way to know something of himself. In this missionary service he might even impound the help of the oftentimes too-busy father or the too-social mother. And so, in this natural way, the young candidate might be led to make, naturally and wisely, his life choice. What we can do well we always like, and the converse holds to the measure of our gift, that what we like we do well. And to most of us there is need of such slow, empirical decision. To very few is vouchsafed a clear, imperative, clarion-call to certain work. In this material sense upon the young forehead the fate is seldom clearly written.

As many of you know a step in this direction has already been taken by several of our leading medical schools. Following your example, at McGill it is arranged that students of the first year in medicine work are under the eye of a small committee. This personal committee, as it is called, is chosen from their teachers, men of sympathy, insight, and tact. Its chief concern is the weak student or the "waster"; to encourage and advise him, to get to know him on his human side. At the end of the year if the man shows little interest in, or no aptitude whatever, for the study of medicine he and his parents are advised to reconsider his choice of a profession. And already results have shown that this step is in the right direction. True it is that this advice is given a little late, only after the career has been chosen and begun. In consequence it may not be the best of economics, still it is better late than never, and it permits to the boy the test of actual experience in the work, and may save him from the hideous blunder of a mistaken choice.

So it is that such a method demands from each student a certain measure of adaptation to the chosen work. To this extent it rids our medical schools of the "chronic," the unfit, and it so ensures to the teacher, our chosen teacher, a student-material in some degree worthy of his gift. Thus, in some small way, it provides the second requisite in our necessary equipment for the teaching of obstetrics, namely, the good, adaptive student.

So much, then, for the good teacher and the good student whom he teaches. It takes two to make even a bad bargain.

Among those of us who know it is universally admitted that medicine is the most exacting of all professions. From its disciples it demands so much both of theory and practice, and the one is so useless without the other. It is the whole transaction with life itself, and with death itself, and there is so much to know, and then there is so much to do. In the greatest degree it is both a science and an art.

To qualify in any worthy sense for such a profession is indeed an onerous business; and especially in the clinical or final subjects, where the actual study of medicine begins, the task is heavy both for the teacher and the student. For the latter there is now the first encounter with the great acquaintance of his working life, the patient; the man, and very specially the woman and the child. And it is, you may believe, a most fateful encounter, fraught with so many possibilities. Two has so long been the company of the teacher and the student that this great third person—the patient—makes it at first no company at all.

Good teaching is essential here; for in my opinion this is the most crucial time in the whole undergraduate life. Men oftenest go wrong, in a professional sense, just where they begin this, their craftsmanship. The work is no longer on the bench but at the bedside. These first days of clinical instruction are truly all-important days; for it is in reality a first entrance into a new world, a world of observation, a universe of actual things. Here the man must learn to specially apply his senses, his sight, his hearing, and his touch, for here begins the craft of his profession, the recognition of disease. And these novitiate days are always dark and disappointing, with the new stethoscope in the ears, and the sausage-like plessor finger that elicits only a sausage note. The palpation hand is dumb, elephantine, paralytic. Now, if in this time of sorrow, the student should possess a great, or even a good teacher, he should give daily thanks to his Maker. For such a teacher will wisely direct him in that strait and only way which leads upward to complete mastery of the craft. He will not only tell him what to see and hear, but how to see and hear, and, what is more important still, will make very sure that he actually has seen and heard. A mistaken perception is so infinitely worse than no perception at all. Only in this way can a good and honest method of observation be acquired, the method which, like the fear of the Lord, is the beginning of clinical wisdom.

And so under his teacher's care the young clinician goes forward, very slowly at first, training the casual eye and the clumsy hand;

and carefully storing away in his memory his prized perceptions till, in some degree at least, he has mastered the art of recognizing disease. This art, this physical diagnosis, is the staff and the scrip of his professional pilgrimage. Yes, there is need of good teaching here. And there is absolute need of clinical material, for not even the proverbial brick could be made without straw.

To the average practitioner of medicine, the "medical man in the street", the subject of obstetrics is the one, perhaps, of greatest importance. For, while parturition is rightly enough a physiological process, the morbid conditions of our modern life have conspired to make of it almost a pathological calamity. This unfortunately is so true that, provided the vermiform appendix has been removed, it is midwifery that furnishes the greatest number of serious emergencies in general practice. Rest in bed and a milk diet serve innocently well in housemaid's knee or typhoid fever; and hours may even pass without much damage to a broken leg. But assuredly none of these is a second stage floating head, a transverse presentation, a placenta previa, or a hemorrhage postpartum. How seldom in these cases is there time to read it up or call a consultant. No, the "obstetrical man in the street" can but invoke the teaching of his old school, and fight it out alone. And what a grim tragedy it sometimes is!

It goes, I think, without saying that the main aim of our medical schools is to provide the greatest good to the greatest number; and this is only another way of saying that their main object is to equip the man well trained for general practice. For certainly in this way they best serve our present day and generation.

I have never heard it denied that in this general equipment a large place ought in all conscience to be given to obstetrics. And yet, speaking generally of our American schools, this very training in obstetrics is the weakest page in the whole curriculum. As remarked by Whitridge Williams some three years ago only sixty of our 120 medical schools were in this respect pronounced "acceptable" by a tribunal composed of ourselves, whereas a mere six were admittedly possessed of adequate clinical training in this subject. Small wonder is it then if in Canada and the New England States some 500 women die each year in childbed; and some 5000 are therein more or less permanently disabled. And there may be something more than poetry in the boast of the general surgeon that in America it is safer to have one's abdomen opened for any chronic condition than it is to bear a child.

There is no doubt, I think, that obstetrics has not kept pace with medicine and surgery—that in the great forward race it has run a poor third. And yet, if you remember, as between modern surgery and obstetrics, the race was started fair; for if John Hunter is called the "Founder of Scientific Surgery," with equal truth can William be known as the "Father of Scientific Obstetrics;" and William was the elder brother. Surgery, it is true, fell heir to the larger kingdom, and for this very reason, perhaps, has made larger use of its hundred and fifty years. By the very brilliancy of its achievement, especially in our own country, it has rather blinded our vision, our academic vision, as to what is the greatest need in the general practice of our profession. The bold and ambitious scalpel has partially excised our very sense of proportion, till now it seems to me, it were almost better if so-called classic surgery were entirely banished from our undergraduate curriculum. If it is important to be in the world at all, the manner and matter of our entrance are surely the first consideration. And we know, only too well, that the price in motherhood and in infanthood is still cruel high! The whole problem is, after all, one of fixing values, of securing just proportion.

Already there are signs of the remedy of this. During recent years, not only has there been a re-awakened interest in the science of obstetrics—in antenatal pathology for both mother and child a whole chapter has been written—but there has been a growing perception of the need of better teaching. The added knowledge of the far-reaching importance of the work itself, and its unborn possibilities, have served but to emphasize the imperfect training in many of our schools; the mortality returns in childbed pronounce a severe impeachment; and James P. White of Buffalo, who in America inaugurated clinical teaching of obstetrics, is no longer the voice of one crying in the wilderness as this Congress so abundantly testifies. The work of this Congress is a great missionary service, and you that work therein are in the highest sense missioners. "Inasmuch as ye have done it to one of the least of these"—these children. All these things bespeak the coming Reformation.

The urgent demand, rightly enough made loudest in the profession itself, is for more practical training, for greater clinical instruction. It is the answering refrain to the far cry of the coming mother and her child; for we who practice medicine "we have heard the children crying Oh, my brothers." Something has already been done in this respect in our leading hospitals and schools, for at least the tradition of the mere man-midwife has, I think, been finally discarded. But there remains still much to do. The imperative and absolute need is for a large and more adequate teaching service in our hospitals and dispensaries. I verily believe that each and every hospital is so much the better in its adequate care of the sick by very reason of its teaching; it is thereby saved from Chauvinism and decay. And, granted such clinical service be vouchsafed, I confidently stand sponsor for any worthy medical school that it is only too ready to employ it. And this provision of clinical service it is both the duty and the privilege of the laity to bestow. Each and every Lying-In Hospital should, if possible be affiliated with a teaching school, and on its corner-stone should be written: "For the Healing of the Sick, and the Proper Teaching of the Healers of the Sick."

This, then, is the third part of the necessary equipment of our teaching schools, namely, adequate clinical facilities.

The requisites of good teaching are accordingly three: the teacher, the student to teach, and the patient on whose immediate behalf he teaches.

Samuel Butler has written: "If I had one thing to say to students before I died (I mean if I had to die but might tell students one thing first) I should say: 'Don't learn to do, but learn in doing.'"

In this saying there is embodied the whole truth of the whole business. We really only learn in doing, and a student never really knows a thing till he has done it. This is a general principle from the nursery to the fourth dimension; it holds true with everything under the sun, for not of the brain only is true knowledge. Even right feeling for ourselves and for each other, the very virtues, is really only doing things with our feelings.

Of your own profession this is the very truth, and the hospital is, or should be, the student's workshop. Here the student really learns, for here he works. He begins at the beginning, doing things, and it is only in, and by, such service, that he gains in any sense professional wisdom. His teacher, the master-workman, directs alike the brain and hand, and bequeaths to both the priceless entail of his experience. Under such careful supervision the pupil applies his knowledge, and so wins skill and method, and a growing confidence in himself. Day is so added unto day of larger responsibilities. In a word, he serves a fair apprenticeship, for he learns his trade.

And for obstetrics all this means the Lying-In Hospital. How else can he be taught, and where else, in Heaven's name, can the young obstetrician learn his business? In no place else can he so righteously be trained, can he in fact be trained at all, and in no other way can the interest of the patient be decently safeguarded. Tell it repeatedly in Gath that there is no power of magic in the medical degree; for if, as undergraduate he be ignorant and untrained, he will as graduate be only something worse. And the school that sends him forth, pronounces him fit to practise, is really the chief accomplice in the murder. There is no argument about it, for two and two make four. In teaching obstetrics an adequate hospital service is an absolute requirement; for, without it, both the teacher and the student are together a reproach.

To quote Butler once again, "Woe unto the specialist who is not a pretty fair generalist," and, of a truth, is it woe unto the obstetrician who has not had a good general training. Moreover, in my opinion a good obstetrician should have special training in pelvic surgery just as the gynecologist should possess practical knowledge of obstetrics. These two subjects are in great degree coordinate; and the one is more or less incomplete without the other.

In American obstetrics to-day this need of clinical facilities is the great deficient. Important as he is, I feel sure we have the teacher, and I know we have the student; but in many of our schools we have not the adequate hospital service. It is our bounden duty, layman and physician alike, to attend to this.

No longer must it be possible for any graduate to say that his practical training in obstetrics consisted merely in observing cases at a distance of so many feet; for, useful as such a man might be as an observer, he is not an obstetrician.

Modern life lays the load still heavier upon us, and, so far as we can see, the obstetrical road winds up-hill all the way. With wider vision, as Dr. Newell so forcibly reminds us, there are new problems at every turn. We serve, it is true, our own generation, but as teachers we do much more than that. It is for us to see to it that here we give faithful account of our stewardship.

A great profession, this our profession of Medicine, as great as humanity itself. We, its obstetrical disciples, stand always at life's threshhold to welcome in the new-born; within our arms and looking to our strength mankind enters this world; ours is the care at the beginning. This, ladies and gentlemen, is our profession, and our destiny is to serve therein until for us the night cometh.

THE RELATION OF GYNECOLOGICAL SURGERY TO BAD OBSTETRICS.*

BY

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PARTURITION is perhaps more difficult in the human race than in any other species in the mammalian kingdom, and in consequence much of the subsequent health of women depends on the care which they receive during the process of generation. Thirty years ago it was not an uncommon thing to see women die from mere exhaustion in unrelieved labor; a considerable percentage of all women died from the obstetric infections, and a larger percentage were left invalids after exhaustions which were not severe enough to kill. Thirty years ago almost all women who had borne children suffered from the result of unrepaired tears and the other mechanical injuries of labor. The grandmothers of that day were almost all elderly women, of whom little capacity for active exertion was expected. Even in the better-cared-for classes they stayed at home the greater part of their time, and when they went out drove because they could not walk. To-day the grandmothers of the better-cared-for classes are mostly young women, who walk freely, play golf and tennis, and are active in all the walks of life. This change may, I think, fairly be charged to a corresponding improvement in the practice of obstetrics.

To-day the obstetrics of the better-cared-for classes is pretty good. Most women among them escape any very severe degree of the evil results of parturition, and those who find themselves in any degree the worse for labor tend to seek early repair from the gynecologist. We do not to-day see among the better-cared-for classes those inactive old women who were the rule when we were children. In lesser degree the same improvement is to be observed in all classes in the community; and an increase of this improvement is, I take it, one of the objects of this meeting.

Obstetrics has improved in all ways. The bad obstetrics of today is seldom bad enough to cause death, but its faults are the old faults; and the exhaustion of comparatively unrelieved labor, the

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minor septic infections, and the mechanical injuries which so often result from labor still contribute their large quota to the gynecologist's practice.

Nothing in the neurasthenias which so often follow the exhaustion of neglected pregnancy and labor is more difficult than the decision to what extent their symptoms are to be attributed to actual local damage, or how much to weakened general condition and lessened power of resistance. Strong, well, and powerful women who have been in good condition through pregnancy need but little care in labor other than the avoidance of infection and the minimization of tears. Even delicate women usually go through carefully attended pregnancies and expedited labors, without permanent loss of health. The degree of the disturbances of pregnancy and the amount of labor which can be endured without injurious exhaustion varies with the strength of the individual woman, but all women who reach term exhausted and in bad condition tend to have lingering labors; and if their labors are likewise neglected and allowed to become unduly exhausting, they almost inevitably go through long periods of invalidism or depressed health, even though they may seem to escape the direct local lesions which bring them within the domain of gynecologic surgery as such. Such women are, however, usually improved by a subsequent well-conducted parturition; indeed, nothing in my experience as an obstetrician was more striking than that when such women subsequently became pregnant, were cared for accurately throughout pregnancy, and stimulated and hurried through labor, they usually not only escaped the neurasthenia which had followed former labors, but as a rule started off upon a new phase of greatly improved health. I believe, however, that this fact, which I saw too often to doubt its existence, is probably to be explained on the basis that this apparently purely constitutional ill health is in reality the result of unsatisfactory local conditions; that women in whom the processes of pregnancy and parturition have resulted in utter exhaustion are not able to conduct the processes of restoration of the genital organs to the normal in an efficient manner; and that their continued ill health or neurasthenia is thus in some degree the product of abnormal local conditions, though without definite and grossly recognizable lesions. No other explanation seems to me adequate to account for the improvement in general condition which so generally follows a subsequent well-conducted childbirth. There can certainly be no doubt but that general poor condition adds to both the severity and permanence of the evil effects of local lesions.

Lack of time and space must prevent repeated references to this subject here, but it should be understood, nevertheless, as deserving emphasis in every section and at every stage of what remains to be said.

The modern gynecologist believes that a very large proportion of the cases which he is called upon to treat are the results of past infections, many chronic inflammatory states which were formerly attributed to other causes being now recognized as secondary results of preexistent infections.

Infective lesions of obstetric origin may be localized almost anywhere in the genitals, as, for instance, in the mucous membranes as an endometritis, or in the walls of the uterus as a metritis simulating subinvolution, but they usually in the end invade the Fallopian tubes and are most important and obstinate in that situation. We have only recently realized that many of the chronic tubes which we see as gynecologists originate in obstetric infections which are so slight as to be frequently unrecognized as infections at the time of their occurrence. These lesser grades of infection may in fact be so mild as to show little evidence of their existence during their acute stage, other than a moderate elevation of temperature with perhaps a little temporary pain or tenderness on one side or the other of the abdomen; and may yet be capable of originating a long-continued, low-grade inflammation, which eventually results in a ruined tube, chronic ill health, a resort to the gynecologist, and not improbably an abdominal operation. Such infections appear of little consequence at the time, but are sometimes far from trifling in their importance to the patient. If the obstetrician is so far a gynecologist as to be practically familiar with these remote results, the mildness of the initial symptoms is not likely to lead him into a false security. If he is also an expert in pelvic examinations, from the gynecological standpoint, he should be able to make a diagnosis of the existence of an infection in even the extremely mild cases; and he can then do an immense amount to prevent them from ending in chronic inflammation and disastrous remote results. An obstetric attendant who is not in practical touch with gynecological work is, however, too apt to consider these attacks unimportant, and to explain them in ways which are more agreeable to his pride, rather than to admit the presence of an infection. If he is inexperienced in gynecological work he is moreover apt to fail to diagnose them even if he is conscientious enough to try. The acute attack then passes off, and no attention is paid to its consequences during the remainder of the convalescence. In the majority of cases the affair receives no further attention until the patient turns up in some gynecologist's office after the lapse of months, or often several years a typical history, such as she then gives is that she has not felt really well since her last labor, that her monthly periods have been uncomfortable, and that she has from time to time been conscious of transient attacks of abdominal pain and tenderness. She has become nervous and irritable and in general unfitted for the duties of life. All these symptoms have gradually increased, and they are now becoming seriously important. Upon examination one or both tubes are enlarged and inflamed, and this condition is an adequate explanation for all the symptoms of which she complains.

There can be no question that such a case so presented is the result of bad obstetrics, but the histories are not always so distinctive. There are many doubtful cases, the relatively great importance of the lesser obstetric infections as a source of chronic disease has only recently become clear, and many persons are still too often misled by a theory which was for a long time widely accepted, and which still has so wide a popular acceptance that it is important to refer to it here.

It was formerly the custom to refer all doubtful cases to a hypothetical gonorrheal origin, but this superstition is much less prevalent than it was. The dramatic and striking theory that a man who had once been the subject of a gonorrhea and has been apparently cured for years, nevertheless habitually remains for long periods capable of infecting the innocent girl whom he subsequently marries, was set forth some twenty odd years ago on quite high authority in so specious and persuasive a manner as to obtain general acceptance from the profession, partly no doubt from the catchy title of "Marital Gonorrhea" which was attached to it. From the profession the theory of the enormous prevalence of "marital gonorrhea" spread generally to sociologists and to the thinking public in general, and has worked a great amount of harm. Now that the profession is recovering from its hysteria on this subject it is time that more correct views should be urged upon such gatherings as this.

It must not be understood that "marital gonorrhea" is wholly a myth; there is no question but that there are exceptional individuals who, though apparently cured of a gonorrhea and free from symptoms, nevertheless remain sources of contagion for prolonged periods, precisely as is now known to be the case with some individuals who have had typhoid fever; there is, however, absolutely no evidence that such a condition is in any sense common, and there is abundant evidence that it is of exceptional occurrence.

More careful study of case histories has moreover made it clear that a large proportion of the chronic salpingites which were formerly loosely considered gonorrhea are in point of fact obstetric in their origin, and a majority of the remainder are probably referable to a third source of origin, to which a few words may properly be given here. The skin of the vulva and perineum is always surgically unclean with colon bacillus and other intestinal bacteria. In the ordinary course of life these bacteria are mechanically introduced into the vaginæ of married women at frequent intervals, and chronic infection of the organs thereby is prevented only by a protective mechanism in the chemical and mechanical reactions of the secretions. These reactions are, however, delicate and easily thrown out of adjustment and a considerable proportion of the chronic infections probably originate in this sort of accidental contagion by nonspecific bacteria.

It is unnecessary to go further into these side subjects, but some reference to these other forms of infection has seemed necessary to a presentation of the now undoubted fact that unrecognized minor obstetric infections are responsible for a great amount of the pelvic ill health of women.

These infections occur with great frequency in the community at large, and are not rare even among the women of the better-cared-for classes, or in the practice of well-trained physicians, yet even the minor infections have been well-nigh eliminated from surgery. The contrast is a marked one and at once raises the question, How far are we justified in blaming our obstetricians for this difference? At first sight the fault would seem to be theirs. A closer analysis will, however, refer it to an essential difference in the conditions under which the two kinds of work are done.

Infections will become as rare in obstetrics as they are to-day in surgery only when all labors are conducted in specially prepared rooms, and only by specially trained obstetricians, each of whom is moreover surrounded by a corps of assistants, trained to anticipate his every want and to render it practically impossible that his hands should at any time touch anything that has not been previously rendered aseptic. These are the conditions which are provided for surgical operations.

A proposal to surround all or indeed any of the labors of the community by such precautions is, however, at present a mere *reductio ad absurdam.* Except in the rarest of cases it is economically impossible to furnish such attendance throughout the whole length of labor outside a hospital; and the relegation of all labors to hospitals is impractical in our present degree of civilization—even if a sufficient supply of such hospitals existed, which it does not. The women of the better classes will not, the wives of the poor cannot, leave their homes, and in many cases their children, for the sake of better attendance in labor. In point of fact, it is doubtful whether the amount of ill health of obstetric origin which exists to-day is as great an evil as would be involved in other economic ways by such a change of habit. The moderate frequency of the minor obstetric infections which obtains to-day among the well-to-do classes and in the hands of the best obstetricians is probably the highest degree of the prevention of infection which can reasonably be aimed at.

It is, however, within the power of such an Association as this to exert great influence toward the almost equally important object of the prompt recognition of all infections as such. Many of the minor infections are unquestionably recovered from without lasting ill effects. It is probable that if all of them were recognized as important, and subjected to early and sustained treatment, the proportion which prove harmless would be enormously increased. To-day the community believes that every infection is the fault of the obstetrician, and it is only among the most intelligent patients that any practitioner dares admit that any complication which occurs is the result of infection. Under these conditions but few physicians will be over-ready to diagnose or treat doubtful and mild seeming attacks as being important on account of the possibility that they are infections. When the community has been taught that the conditions under which labor is conducted render the occasional occurrence of the minor infections humanly speaking inevitable, then the first step toward their early recognition and prompt treatment will have been taken.

The mechanical misfortunes of labor which are of interest to the gynecologist are the tears and displacements, and the combinations of these lesions, especially if they are complicated by subinvolution. There are two common tears. Tears of the cervix tend to heal spontaneously if the labor was thoroughly aseptic. It is only in the presence of some degree of infection that they result in the slow healing and the formation of cicatricial tissue which in the end brings their victims to the gynecologist. Tears of the perineum remain open and heal over in this condition unless they are repaired by suture. This tear is of almost invariable occurrence, some degree of it being produced in practically every labor, and one of the greatest obstetric advances of modern times is that the recognition of this fact has led to its habitual primary repair. It was formerly believed that all tears were the fault of the obstetrician, and as an almost inevitable consequence of this injustice only the worst of them were admitted and sutured; the remainder of them went unrepaired. The community now know that some degree of tear is inevitable, the obstetrician never hesitates to look for them, and all but the most trifling are promptly repaired.

It is not, however, generally understood that primary repair is seldom completely satisfactory even in the most skilful hands. The community as a whole still believes that any imperfections in the results of primary repair are necessarily the fault of the obstetrician. As a consequence of this injustice few obstetricians examine the results of their repairs unless in the process of the removal of sutures, and few admit any imperfection in the results even when they are bad. In skilful hands primary repair yields in the great majority of all cases results which are of great value at first since they postpone trouble for many years, but which are often not sufficiently good to afford first-rate support after the muscles have been repeatedly overstretched in the course of subsequent labors, or after they have lost their resiliency in the process of the change of life. Every woman who has been torn should be examined after the lapse of some months from her delivery, and should then be honestly informed as to how good the results have been, and what she may probably expect from them in the long run. So soon as the community thoroughly understands that the permanence of the results of primary repair depends quite as much upon conditions which are beyond the control of the obstetrician as upon his personal skill, that variation is to be expected and provided for, so soon such examinations will become the rule; then cases in which the muscles are yielding and stretching will be cared for early and when minor means are sufficient, and an immense amount of ill health will thus be saved. The gynecologist can do the community no greater service than to spread broadcast among women the information that women who go into the change of life with their organs in good condition tend to pass through that process with little or no disturbance of health, and to be thereafter in better health than they have known before rather than in worse; on the other hand, those who enter upon the menopause with their pelvic organs in disturbed and damaged condition inevitably pass through a period of nervous ill health, which unfortunately then tends to persist in greater or less degree during a large part of the remainder of life. All women who have borne children should be looked over at the end of the child-bearing period in the early forties and any abnormalities then found should be corrected for the sake of their health during the remainder of life. Originally it was the office of the dentist to pull teeth, now it is his business to preserve them. Women approaching the menopause should consult the gynecologist in precisely the same spirit in which we have all learned to go to our dentist throughout life.

Displacements of the uterus of puerperal origin are practically always complicated by subinvolution of the uterus—that is, its failure to return to a normally small size or to a normally firm consistency as a result either of infection or of mismanagement of the convalescence. The prevention of subinvolution rests on the observance of that extreme asepsis which is perhaps the most important of all items in obstetric practice, and on that adequate care of the convalescence which has now to be spoken of from the gynecologist's point of view. All women desire to get up early both from the irksomeness of remaining in bed and also frequently as a matter of pride. Many physicians yield to this desire of the patient against their own judgment and for the sake of pleasing them. From time to time there have been well-known obstetricians who have advocated getting the patient up early, but it has usually been remarked that the patients of these men were very apt to become in excessive number the patients of other gynecologists in the vicinity, and I know of no opinion in favor of this practice now.

I have noticed with much interest that the wives of gynecologists, and, indeed, even the wives of obstetricians who are not gynecologists, always stay in bed at least three weeks. They often stay in bed longer, and they are always very restricted in their lives for from three to four weeks afterward. No trained expert whom I have seen under these circumstance has seemed to have any doubt but that *his* wife must pursue this regimen, no matter how well she feels, or whether she likes it or not. The stronger the muscular system of a given woman the more likelihood of her escaping the evil results of getting up too early after delivery, but it is not a desirable thing for the strongest woman, and the reasons for this become apparent when we consider the details of what the organs go through in the process of repair after childbirth. The uterus immediately after delivery weighs upward of 2 pounds and is very soft and flaccid, easily assuming any shape into which it is pressed. The nonpregnant uterus weighs but 2 or 3 ounces, and is normally so firm as to be susceptible of but slight change of shape. This great reduction of weight and change of consistency is not thoroughly completed under eight to twelve weeks, but proceeds so much more rapidly at first that by the end of three to four weeks the uterus is usually of not more than twice its normal weight. The involution of the uterus is, however, not the whole process. The supports by which it is held in place also elongate and soften during pregnancy as greatly as does the uterus itself. They are left after delivery long, loose, and flaccid like the uterus, and their involution occupies about the same time. If a woman who has not been delivered more than ten days or a fortnight is allowed to return to active life in the erect position with her uterus still many times heavier than normal, still soft and capable of almost any change of shape, and held in position only by supports which are still long, soft, and weak, arrest of involution and a high percentage of displacements is the necessary mechanical result. Properly long duration of stay in bed and the resumption of the recumbent position at frequent though decreasing intervals after the patient begins to get up helps involution and tends to prevent the occurrence of displacements.

One other point should be noted: displacements which have once been acquired are rarely permanently relieved without operation except by active treatment of them immediately after the termination of a subsequent pregnancy. If treatment is undertaken at that time the vast majority of them can be permanently cured by minor treatment. A uterus which has once been displaced always tends to resume its displaced position during the puerperium, and if the surrounding supports are allowed to return to their normal degree of contraction and firmness while the uterus is still displaced the woman has a return to her original condition of established displacement. If, on the other hand, the uterus is held at this time in normal position, until the supports have returned to normal contraction and firmness with the uterus in this position, the woman will start again with her uterus firmly held in normal position and with but little liability to the recurrence of a displacement. This fact is but little known in practice. It is, however, not theory but a process which I have observed again and again, and which I have but rarely known to fail.

Any woman who has been the subject of a displacement should should have treatment for the displacement undertaken at about the tenth day after delivery. The uterus should be placed in the position of anteversion and a very long, though if necessary narrow, pessary should be arranged to hold it there.[1] The vagina is of course

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[1] Even if there has been a laceration of the perineum and primary repair it is usually possible by this time to introduce the necessary pessary without disturbing the stitches.

at this time capacious and is in the process of involution, hence a pessary which is as large as is necessary at first will soon become too large, and it is necessary to reduce the size of the pessary at frequent intervals, at first as often as once a week; as involution progresses it is, however, slower, and the pessary will need less frequent changes. If the uterus is held in anteversion until the end of the first six or eight weeks and in normal position for a couple of weeks thereafter there will be but few cases of recurrence of the displacement, and this is about the only time in a woman's life when an established displacement can be permanently cured by the use of a pessary.

Thirty years ago the death rate of obstetrics was enormous—until that was reduced its morbidity was a comparative unimportant matter. To-day the death rate of obstetrics is low, and so far as we can at present see, as low as it is likely to become, but the amount of ill health from obstetric causes through out the community is still large, and most of it is preventable and unnecessary. The improvement in this respect which must be aimed for, and should be attained, is rendered difficult by the fact that these evil results for the most part appear along after the confinement, and even though they may be directly due to it, are too often unconnected with it in the mind of the physician. To this evil the system of teaching these subjects and of specialization in them which is somewhat widely prevalent in America largely contributes.

Everywhere else in the world obstetrics and gynecology are regarded as one subject, are so taught to students, and to a great extent are practised by the same men.

Many communities in America are served by gynecologists who have never known anything about obstetrics, and by obstetricians who know nothing of gynecology. In these communities students are consequently taught their gynecology by men who know nothing of the obstetric origin which underlies so much of it, and are taught obstetrics by men who rarely see a case after the woman is up and about from childbirth. Can we expect that men who are the products of such teaching will conduct the labors of their patients with much regard for the happiness or health of their after-lives?

THE NEED OF HOSPITALS FOR MATERNITY CASES.*

BY

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NOTHING is more characteristic of modern medical science than the development of the hospital. In the thickly settled parts of this country, well-equipped hospitals are so numerous that with good roads and motor ambulances the sick can be safely and rapidly transported to hospital in all serious cases.

In obstetrics less use is made of hospitals than in other branches of medicine, and with great loss to the community and increase in suffering and mortality.

The objections commonly urged by patients and their friends when confinement in hospital is proposed, come broadly under two heads: The first, a practical consideration; the second, a matter of sentiment.

Practically, the transfer of the mother to hospital for confinement temporarily breaks up the family. If the husband is a periodic drunkard he will use this opportunity for his customary indulgence. The children will be scattered, or the lodging may be given up, and the mother returns to her home from the hospital to find the home in a state of confusion. Hence the plea which women among the poorer classes so often make, that they cannot leave home to enter hospitals.

Among those of moderate circumstances who are neither poor nor rich, there is great need of moderate-priced rooms in hospitals for confinement cases. From $10 to $15 per week is often all that such persons can pay for the expenses of a confinement, excepting the doctor's fee. Many of our hospitals have considerable ward space, and private rooms at from $20 to $50 per week. Those who need moderate-priced rooms are those most deserving of hospital care, for they are among the reliable, industrious mass of population who make the very backbone of the nation.

Social service work should meet the objection that the admission of the mother to hospital for confinement will disorganize the home. We look to social service for the temporary care of the home, for the children, for oversight of the husband if necessary, and to keep

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* Read before The American Association for Study and Prevention of Infant Mortality, Boston, November 13, 1914.

together this unit of population until the mother can resume her place in the home. Already the need for moderate-priced rooms for confinement cases is being appreciated, and in the newer maternity hospitals such are provided.

The sentimental objection to going to hospital for confinement also centers about the ideal of home. A patient accustomed to every comfort, but who has great physical disabilities, recently urged that she could not think of having her child born in a hospital. To her mind the idea seems tinged with the flavor of poverty, or possibly implied disgrace. When we remember the origin of hospitals, that they have developed where centers of religious evolution and civilization have reached their highest development, and that the modern hospital is perhaps the most finished product of modern civilization, we see that this objection is founded upon sentiment, and without reason.

Among ignorant persons there is objection to going to hospital through fear of surgical operations, and because distorted ideas concerning hospitals are instilled into the minds of the poor by midwives and unworthy physicians, to prevent the loss of personal gain through practice.

Our experience up to the present time indicates that two classes of patients without doubt should enter the hospital for confinement: For a *first* confinement there can be no question of the relative safety for mother and child of confinement in hospital and in a private house. The mother's subsequent health depends largely upon the management of this first confinement. Surgical aid is required in a much larger percentage of cases than in subsequent confinements, and perfect recovery is only possible with good surgical care. The life and health of the child, and especially the integrity of the nervous system, are more in danger in the first confinement, and hence the greater necessity for skilled attention.

Again, those patients who are abnormal in size, or in physical condition, urgently require hospital care. This may become necessary during the early months of pregnancy or may be required during the entire period of gestation. Ballantyne has well urged the necessity for pre-maternity hospitals where pregnant women suffering from various complications may receive adequate and skilled attention. The lives and health of mother and child may frequently be saved by such care.

In cases of deformity and lack of development the hospital has robbed parturition of its terrors, and surgery has made possible the safe confinement of the mother, with a mortality rate but little greater than that of natural birth, and an infant death-rate which is practically nothing. Even the poor and most ignorant appreciate this aspect of the case. As witness, a postcard sent by Mrs. Flaherty to a friend: Mrs. Flaherty was unfortunately deformed and had lost several children in her tenement home in long and painful and miserable confinement. She finally sought the hospital and was safely delivered of a vigorous infant by Cesarean section. Eager that a friend of hers should share its benefits, she requested the nurse to write a postcard, with the following communication: "Mary dear:

Come in. It's a fine way they have here. They put something over the nose and when you wakes up your baby is squalling beside you, and you taste like a paint-shop for two or three days."

Observation shows that confinement is most safe and successful between the years of seventeen and twenty-five; that prior and after that period the complications of parturition increase. The mother of a large family should receive special attention in her last confinements, for the forces of Nature have become weakened and there is often excessive development in the child. Many of the most distressing fatalities among the poor occur in these patients who try to remain at home, but who sadly need hospital care.

It is commonly believed that the work of Pasteur and Lister, the introduction of antisepsis and asepsis in surgical practice, and the application of modern methods to obstetrics, have virtually stamped out puerperal fever. This is true of hospitals only. To-day no well-appointed and properly managed maternity hospital has a death-rate from puerperal fever more than 1 per cent.; but the death-rate from outside of hospitals is much greater than this, and cannot be ascertained. In spite of the efforts of authorities to secure accurate death-rate statistics, cases of puerperal fever dying in the hands of ignorant and unscrupulous practitioners are reported under other names, and often pass undetected. Until we have a uniform law requiring notification of puerperal fever, as of small-pox, scarlet fever, or other infectious diseases, the exact frequency of puerperal fever outside of hospital will not be ascertained. There is every reason to believe that outside of hospitals the mortality from puerperal fever has not materially diminished for a number of years. This is especially true among the poor and ignorant, among whom ignorant and dirty midwives and physicians infect large numbers of patients. Some idea of this may be obtained by Roth's recent paper in the *British Medical Journal*, July 5, 1913, in which he states that in England and Wales over 3000 women die every year from puerperal septic disease and the accidents of childbirth. The septic mortality among infants is also considerable and cannot be accurately ascertained outside of hospital. Some idea of the general mortality among infants is given by Roth's further statement that during the first year of life, in one year in England and Wales 99,430 infants died, and that in addition there were 19,000 stillbirths.

Surgical science addresses itself especially to preventing death, suffering, and ill health from septic infection and hemorrhage.

Writing upon the necessity of recognizing midwifery as a branch of surgery, Bonney in the *British Medical Journal*, March 15, 1913, states that in England and Wales, one mother in every 228 died during a period of nine years—from 1897 to 1906—these deaths occurring primarily from puerperal septic infection and from hemorrhage. Puerperal fever alone in the year 1909, caused the death of one mother in every 609. The complete return of the mother to health depends largely upon the surgical repair of injuries received during parturition. In 543 patients confined for the first time, but 40 per cent. were found to be in normal condition, while convalescent, by Solomons, in the Rotunda Hospital in Dublin, a well-known institution (*Journal of Obstetrics and Gynecology of the British Empire*, July, 1913). As these patients were accurately examined the statement must be received as a conservative one. Outside of hospital an accurate diagnosis concerning the condition of the mother after confinement is rarely made.

If we turn to the morbidity among infants, we have in ophthalmia neonatorum, or the blindness which results from infection in the eyes of the new-born, a striking example.

Hörder (*Zentralblatt f. Gynäkologie*, No. 45, 1912) in thirty German cities found in the asylums for the blind 12–⅛ per cent. of all cases originating in ophthalmia neonatorum, or one-eighth of the entire number.

The regulations for midwives and physicians in Germany are stringent, and if this is true under such a medical system, one can readily imagine a worse state of affairs under other conditions. In over 3000 births in an American city, Tallant (AMERICAN JOURNAL OF OBSTETRICS, November, 1912) found that 1 per cent. developed ophthalmia neonatorum. The contrast between one-eighth of the patients in asylums for the blind who became blind through infection in infancy, and 1000 cases of infants delivered in an American hospital under the writer's observation without a single serious injury to the eye, may illustrate what can be done with hospital care.

It may be interesting to raise the question, What percentage or what proportion of women in confinement will require surgical assistance? I may answer this by the experience of a year in a small maternity department of a large city hospital which has a considerable out-patient service, and to which are brought by ambulance at all hours of the day or night not only normal cases but those which have been badly treated by midwives and physicians, and those which develop especial difficulties. In the recent year, 25 per cent. of these patients required surgical assistance to save the lives of mother and child. Among the operations three-fifths were those which were distinctly major or important surgical procedures. It may be interesting to know that among the patients who required surgical methods there was no death from puerperal septic infection, and that among the cases requiring major surgical operations there was no death from any cause. No child in good condition when the mother was admitted, died. The entire septic mortality among all mothers in emergency and other cases was 0.5 of 1 per cent.

Increased efficiency in the oversight and licensing of physicians and midwives is gradually weeding out the ignorant and unscrupulous, and thus lessening the mortality and morbidity of parturition among the poor. Unfortunately, there will always remain those men without surgical training and experience who because a case is one of confinement, will attempt surgical procedures for which they are incompetent. I may illustrate this by the case of a healthy young woman, living some 18 miles from town, who, in her first confinement was under the care of a general practitioner of very limited obstetric experience. As delay occurred, with three successive administrations of ether, during two nights and a day, he attempted upon this patient three obstetric operations unsuccessfully. The patient was then placed upon a cot and brought in a railway train to hospital. Her life was saved only by a major operation which deprived her of the power of subsequently bearing children.

I recall also the case of a patient who had been sadly maltreated, whose confinement was ended in hospital by a major operation, mother and child recovering, but the child remaining permanently blind in one eye from the violence to which the mother had been subjected.

May I place before you my plea for hospital care for cases of confinement requiring unusual attention, by the following concrete example?

A few weeks ago I was summoned to attend in hospital a previously sound young married woman, already the mother of a healthy little girl. During the last weeks of the present pregnancy she had been under the care of a general practitioner without especial experience, and she had shown signs of a very dangerous condition which threatened her life and that of her child from hemorrhage. For more than two weeks dangerous symptoms were disregarded, and temporary improvement was taken as evidence of safety. Finally, when hemorrhage became alarming, and death threatened, the mother was hastily sent to hospital. On admission, her child was dead, and her condition such that nothing for the moment could be done except to use stimulants with the hope that she might rally. With that prophetic insight which sometimes comes in the presence of death, she appreciated her danger and implored us to save her life for her little child and for her husband, a sailor in the United States Navy, absent on a battleship in Mexican waters. When slight improvement occurred it was possible to bring about confinement without a serious procedure and without pain to the mother. Then, under stimulation the feeble flame of life was fanned into a bright blaze for a brief hour, and then went out forever.

Is this the reward which the civilization of the Republic has to offer to this sailor when he returns on furlough, to find his wife and infant dead, and to be greeted with the lonely, pitiful cry of a motherless child?

SCOPOLAMIN AMNESIA IN LABOR.

BY
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In discussing this subject I am simply going to recount my personal experience with scopolamin as an anesthetic in labor and the impressions I have received and the conclusions I have reached after giving it a thorough trial.

The work represented in this synopsis has all been done in private practice on patients belonging, for the most part, to the cultured, relatively well-to-do class.

I have treated forty cases. While numerically small, the work is valuable because done under ideal conditions in my own private hospital and I have personally presided over each one of these patients assisted by a carefully chosen and well-trained staff.

Very complete and accurate records of all these cases have been kept, each case has been intelligently individualized, and the greatest possible attention has been paid to the observance of minute details, without which the highest degree of success is impossible.

The treatment is very exacting and time-consuming, but, efficiently administered, is capable of such splendid results as to amply repay for the outlay of time and energy. To procure ideal results, one has to be temperamentally fitted for this work, be in a position to drop other work and tie oneself up for hours at a time, and have at one's command a well-trained staff of assistants who are entirely in sympathy with this special method of treatment. I do not think the treatment should ever be employed outside of a well-equipped hospital and even the hospital conditions should be such that the delivery room may be protected from all noise and confusion. Furthermore, the treatment should not be given by anyone who has not thoroughly familiarized himself with all the details connected with its administration.

Anyone who has successfully used this treatment will aver that to produce a state of amnesia and maintain this condition hour after hour, in the face of the ever-increasing severity of the labor pains, is no easy matter and calls for an unusual amount of skill and good judgment. It can be done, however, by any well-trained person who is willing to thoroughly study out the modus operandi and make the necessary time sacrifice.

The personal element will always interject itself very forcibly into this treatment. By this statement I do not mean to imply that there is any personal hypnosis in the matter—the amnesic state being purely a drug-produced condition—but some operators are going to be able to make much finer differentiations between states of consciousness than others and on this ability is going to depend the relative degree of success of the treatment in the hands of the different persons using it. From my personal experience I can clearly see that some are going to use this special treatment with wonderful success and others are going to make of it a woful failure. This will all be a question of personal adaptability, just as some persons are capable of giving a perfectly satisfactory and safe general anesthetic and others are not.

There are a lot of subtleties that enter into this work that make it a little different from ordinary therapeutic practice. In reading, from time to time, the articles that appear on the subject, and the discussion of same, it is perfectly evident to anyone familiar with the treatment that a few have grasped the fine points involved and the majority have not. I simply mention this to emphasize the fact that experience with the use of scopolamin as an anesthetic teaches one many little subtle points that do not appear on the surface at first sight, and that some observers grasp these fine points and advantageously use them and others do not.

What I have been able to accomplish in the cases already treated I am quite sure I can continue to accomplish in any number of future cases with even greater efficiency. I have not had a single case of failure in any of the cases treated. In some I have had more perfect results than in others but in all of them the results have been satisfactory to both the patients and myself. In about 80 per cent. of the cases I have been able to procure a perfectly maintained amnesia throughout; in the other 20 per cent. there have been occasional breaks in the amnesia so that the patients would carry away from their treatment some slight memories of events but nothing unpleasant or unsatisfactory. One or two patients thought they remembered a few pains but were very vague about it.

It is very essential to protect these patients from noise, confusion, or suggestion of any kind. They are oftentimes inclined to be talkative and will ask questions while temporarily aroused during a pain and these questions should be left unanswered. Nothing should be discussed with the patients, and nothing should be discussed among those in attendance on the patient so that the patient can hear it. Her brain is more or less like a sensitized photographic plate and it is very easy, unless great caution is exercised, to convey impressions to it that will be carried away from the sleep and subsequently remembered. I have had many demonstrations of this fact. To illustrate: In one patient, at the height of a severe pain, the membranes ruptured with unusually explosive force and the patient was momentarily startled and asked what had happened. Unthinkingly I told her it was just the membranes rupturing. The only thing she remembered afterward was the rupture of the membranes and she would not have remembered that if I had been wise enough not to reply to her question.

Because of my firm conviction that these patients should not be talked to or interrogated, I do not employ memory tests in my work. I regard them as being unnecessary and distinctly disturbing. I used them in my first patient but have never employed them since. It seemed to me perfectly absurd to keep annoying these patients by showing them objects and enquiring if they had ever seen them before, etc. The application of such tests has the effect of arousing the sleeping consciousness and interferes with the efficacy of the treatment. The keen observer does not require memory tests to tell him when the patient needs another dose of scopolamin.

I do not use the stable LaRoche preparation of scopolamin. In the first place, I could not procure it when I first began this work; in the second place, I was unable to convince myself that Siegel's statistics with its use at Freiburg showed any superiority over the fresh solution that had been in use for several years; in the third place, in a treatment of this kind, I like to make up my own preparations, and my results with fresh solutions have been so good that I have persisted in their use and intend to continue doing so. A fresh sterile solution of the crystalline drug is made up for each patient as required. This solution is thrown away after it is forty-eight hours old and a fresh one made up for the next case. This is a little troublesome and wasteful, but has given me satisfactory results.

I do not use narcophine, and, from what I can gather from reports of its use, I have no desire to use it. I give one-sixth of a grain of morphine hydrochloride with the first dose of scopolamin and never repeat it. I regard the morphine as quite unnecessary to the production and maintenance of the desired state of amnesia. As, however, this semi-conscious condition is not usually produced until after the second dose of scopolamin is given, and, as the pains are likely to be rather active during the time elapsing between the first and second dose, I think the use of one small dose of morphine is expedient and helpful to the treatment.

It is impossible to lay down any hard and fast rules for dosages. Each patient should be a law unto herself. In general, however, my therapeutic technic is as follows:

As soon as the uterine contractions have become regular—say every five minutes—the patient is taken to the operating room, made comfortable on the operating table, and the first hypodermic injection given which consists of scopolamin hydrobromide gr. 1/150 and morphine hydrochloride gr. 1/6. The second dose of scopolamin is given from three-quarters of an hour to an hour after the first dose, depending on the severity of the pains, and, according to the individual susceptibility to the drug as shown by her behavior to the first dose, consists of from 1/200 to 1/250 of a grain. Following this dose the patient falls in a few moments into the characteristic semi-conscious condition associated with amnesia in which she sleeps between the pains, rouses more or less during a pain, but has no recollection of events. From this time until after the birth of the baby there should be no knowledge of anything if the treatment has been properly administered. This does not imply that the patient is deeply unconscious, because quite the reverse is true. She rouses quite markedly during a pain and will obey at any time any given instruction. She momentarily perceives her pain but it fails to register on her conscious mind. As Gauss put it, "She perceives but does not apperceive." This state of semi-consciousness associated with amnesia must be maintained throughout the entire labor and this is accomplished by the occasional repetition of a small dose of scopolamin, 1/300 to 1/400 of a grain, usually 1/300. The whole success of the treatment depends on the skill and judgment displayed in giving these subsequent dosages. A dose must be given whenever the brain is approaching conscious perception *but before it really perceives.* To determine when this time has arrived, Krönig and Gauss make use of their memory tests; I rely on my observation of the patient. When the patient's expression begins to take on a keen look as though, like a child awakening from sleep, she was endeavoring to place herself and find her consciousness, and when, furthermore, she begins to successfully correlate happenings—then she needs another dose. Nothing but keen observation and experience can make one wise on this point, but it forms the basis of the success of the whole treatment. Some patients are much more susceptible to the drug than others and will, under seemingly similar conditions, remain for a much longer time under its effect. The progress of the labor also plays an important part. A fast labor will require more frequent doses than a slow one.

As soon as the head can be seen distending the vulva, I give a few whiffs of chloroform with each pain so that the patient is notably unconscious at the moment of the child's birth. The light semiconscious state produced by the scopolamin is not profound enough to carry the patient through the latter part of the second stage without some assistance. If, however, it has held the consciousness in abeyance through the entire first stage and the first half of the second stage, it has certainly done all that should be expected of it.

Oftentimes, after complete dilatation of the cervix, the course of the labor will lag and something should here be done to stimulate the uterus to a little extra effort. Sometimes a fortieth of a grain of strychnin hypodermically will accomplish the desired result; at other times it is necessary to give a dose of pituitrin. It is very essential that the progress of the labor be carefully watched at this stage and that, if necessary, some means be employed to keep the head advancing.

I have thoroughly convinced myself that, efficiently employed, this treatment offers to women a most wonderful panacea. Not only does the brain, temporarily lulled to sleep by a potent but safe drug, fail to register any pain sensations, but there is also entire conservation of the general nerve forces so that the patient emerges from her labor without any feeling of exhaustion and with all her vital energies ready to respond to whatever demands are made upon them. As a result the mother makes a speedy convalescence and the child shows the effect of being nurtured by a composed woman who has ample milk supply instead of an irritable nervous one with a deficient milk supply.

These statements are not theoretical ones. It is almost inconceivable to see the poise and vital efficiency which these mothers show a few days after labor and to note the practical effect of this on the infants. It is quite the rule for these mothers to tell me after they have been home a month or two that their baby has never kept them awake a single night.

The mothers generally awake from their "Twilight Sleep" ravenously hungry and are given a carefully chosen but good square meal, and from then on are put on a regular three-meals-a-day diet with liquid nourishment in between.

Unless there is sufficient injury to the soft parts to make suturing of the deep muscles necessary, all these patients sit up out of bed on the second day, take a tub bath, and walk around a little on the third day, and convalesce as fast as they like from then on. Most of them go home from the hospital at the end of a week capable of taking care of both themselves and the baby. It has to be seen to be believed. Of course in a small private hospital with a relatively large staff it is possible to give these patients much more individual attention than would be possible under the conditions that prevail in a large hospital service, and this personal encouragement and help make a more rapid convalescence feasible.

This practice of getting patients up so soon after their confinement has caused a good deal of criticism. The criticism is undeserved, however. I have carefully studied the results of this practice and have examined all these patients subsequently and find that, under this régime, uterine and muscular involution takes place more quickly and more satisfactorily than when the patients are kept in bed ten days or two weeks. Furthermore, I have a much smaller percentage of retroverted uteri. Lay aside all traditionary bias and think the matter out, each one for himself, with the involved mechanics constantly in mind and the reasonableness of the thing will soon be apparent. Three or four years ago we were all startled out of our preconceived notions when Boldt and Ries told us we should get our ordinary laparotomy patients out of bed in twenty-four or forty-eight hours. A number of us, still tied up to traditionary usage, took issue with the new propaganda, until Boldt silenced us by saying that no one had any right to criticise who had not tried the new method on a sufficient number of cases to be able to make intelligent comparison. The same statement applies with equal force to the question of getting these patients up early after a confinement which makes no tax on their nerve energy.

In conclusion I would say that, personally, I would just as soon consider performing a surgical operation without an anesthetic as conducting a labor without scopolamin amnesia. Skilfully administered the best interest of both the mother and the child are advanced by its use. All the talk about "blue babies" and "asphyxiated infants" due to the use of scopolamin, so far as my experience goes, is all nonsense. I have no more "blue babies" or "asphyxiated infants" now than I had before I began to use scopolamin and when it happens, as it seldom does, it is due to some mechanical condition. Repeated dosing with morphin or narcophin will affect the babies, but not scopolamin properly administered. Finally, and most important of all, under the use of this beneficient pain-relieving and nerve-conserving treatment, childbirth will not only lose its terror but will cease to be followed by the nervous invalidism that so frequently has characterized it in the past, particularly among the women of the cultured well-to-do class whose education and environment have been such as to poorly fit them for the severe physical and nervous strain which they are called upon to bear in the usual course of labor.

1525 SUTTER STREET.

THE LIMITS OF SAFETY IN BLOOD PRESSURE CHANGES.*

BY

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IN raising blood pressure to the dignity of a main theme, we are in danger of forgetting that abnormal blood pressure, either high or low, is not a disease but a symptom, a mere phrase in a sentence that cannot be understood without its context. And there exists the further danger that we may exaggerate the importance of it as a

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symptom. This, I think, has indeed been done and the profession as well as the laity has become imbued with an unwarranted awe of abnormalities in pressure. Because some cases of high tension are short-lived, the conviction has arisen and has been promptly espoused by the laity that high pressure is a serious omen and needs active treatment.

The blood pressure reading takes rank with urine analysis and blood tests in importance as an aid to diagnosis and prognosis, hence it should become a feature of routine examination. I am inclined to think that a goodly number, perhaps the majority, of surgeons, are not deeply interested in it. If their hospital internes take the pressure well and good. They themselves care little about it. A recent English text-book on Surgery (Choyce and Beattie, London, 1912) has not a word upon the subject.

A single reading of the blood pressure is not sufficient. To be of value pressure studies must be made regularly, and I need only cite the observations of Briggs and of Crile (Blood Pressure in Surgery, Philadelphia, 1903, p. 400) with regard to typhoid fever. They found that the earliest symptom of perforation is a rise in blood pressure. This of course can be discovered only if regular studies are made. Assuming that the pressure is systematically taken what use can be made of it? As I have said it is only a symptom and may therefore, like other symptoms, be misleading. Thus a normal pressure reading may be obtained in a case with a bad circulation—one in which operation might be fatal. We cannot therefore depend on blood pressure alone in deciding whether a given patient is a good surgical risk. When the pressure is abnormal, the case is in some respects simpler. If the pressure is very high, that of itself will act as a "temporary stay of execution" until the case can be more fully studied. What shall our attitude be in the high pressure cases? First of all, we must find the cause of the high tension, for some causes are grave obstacles to successful operations while others, as I hope to show, are not. From the operative standpoint, the most serious cause is chronic nephritis. As this is practically never monosymptomatic, a careful search will show in addition to the hypertension other characteristic signs—polyuria, low content of solids in the urine, hypertrophy of the heart, etc. I need scarcely say to you that an operation should not be undertaken in such patients unless it be to save life. There are, however, cases of nephritis in which the urinary changes are very slight. In them the discovery of high tension, let us say 200 mm. or over, is of very great significance. The factors of safety in such cases are apt to be overestimated, because the ordinary urine examination reveals but little departure from the normal. In such cases the phenolsulphonephthalein test ("the red test") is of great value. It will give information as to the functional capacity of the kidneys and will afford a better idea of the margin of safety than the blood pressure and the urine analysis combined. This is another of the many illustrations of the need in modern times for the cooperation of physician, surgeon and laboratory worker.

Another cause of high pressure that plays an important rôle in surgery is arteriosclerosis. Rigid arteries and high tension are a serious handicap for the patient needing an operation. Nevertheless, many operations have to be done or at least are done on arteriosclerotic subjects, not only those of necessity but many more or less elective in nature. Owing to the frequency with which renal changes accompany the arteriosclerotic process, it is well, if the urine arouses suspicion, to proceed as I have advised in the case of nephritic hypertension, that is to make the functional test of renal sufficiency. Taking arteriosclerosis cases by and large I may say that syphilis is the most frequent cause of the uncomplicated type of the disease. This in certain circumstances is of decided importance; for example, in cases of obliterative endarteritis with threatened gangrene. The discovery of syphilitic infection through the history or the Wassermann test may deter the surgeon from amputation until a trial of therapeutic measures has been made. Operations are fairly well borne in arteriosclerotic subjects provided the heart is competent, and that point a medical man with experience can determine in the majority of cases. I have seen men with arteriosclerosis pass through prostatectomy, radical cure of hernia, gall-stone and other operations with remarkable ease and freedom from complications. But even in the case of heart lesions, particularly valvular defects, the factors of safety are often considerable and unless there is evidence of myocarditis with dilatation and perhaps fatty change, operations are reasonably safe.

When arteriosclerosis is associated with diabetes, and this is the rule in elderly diabetics, then the problem of deciding upon an elective operation is more difficult. My opinion is that even in such cases operation is fairly well borne, provided, of course, that the kidneys are sound, and that the proper precautions are taken to fortify the patient by diet and by alkalies against coma.

There is another form of hypertension which is clinically more or less mysterious. The urinary findings indicate intact kidneys or at least kidneys but little diseased and the superficial arteries as well as the retinal vessels show no change. This form is rather common in middle-aged, stout women, and may give very high pressure readings (190–270 mm.). Some writers see the cause in disease of the kidneys but I am not sure that this is the true cause. Be that as it may, the important fact is that these patients bear operations better than one would expect from the height of the blood pressure, granted that the heart is fully competent. It is among this group of cases that the greatest harm is done by telling the patients of their blood pressure and by subjecting them to more or less violent treatment calculated to upset a circulation that is of necessity geared high and should not be thrown out of balance. These patients are frequently gall-stone subjects and are thus brought to the notice of the surgeon.

It is in pregnancy that the blood pressure, taken as a single symptom, acquires its greatest significance. Dr. Hirst has, both to-night and on other occasions, contributed much to this phase of the subject and I need only say that a rising pressure is one of the early signs of toxemia—a pressure of 130 or 140 is deserving of more attention than at other times. The factors of safety in pregnant women cannot be large, else we should not have the sudden explosions, the eclamptic attacks; but it would be a mistake to hold the high pressure itself, even if it reaches 200, responsible for eclampsia. It is merely a sign of something much more subtle that has not yet been fathomed. But there is an exception to every rule and eclampsia has been noted when the pressure was not raised. Nevertheless, high tension is such a valuable sign in pregnancy that blood-pressure taking ought to become a habit among obstetricians.

Can we do nothing to reduce pressure and thereby increase the factors of safety in operations? Yes, we can, but pressure-lowering drugs of all measures are the least helpful. History repeats itself, and the experience with the use of antipyretic drugs in fevers is being duplicated in the drug treatment of hypertension cases. Our predecessors thought that in reducing the temperature by means of drugs they cured the disease, and many men have fallen into a similar error in thinking that to reduce high pressure by means of vasodilators means a permanent advantage to the patient. If by altering the metabolism of the patient we can lower the temperature or lower the pressure we have made a greater gain. I would not, however, decry the judicious use of vasodilators—just as hyperpyrexia is dangerous *per se*, so great hypertension may be dangerous, and then the *nitrites* are both indicated and valuable.

In cases intended for operation, much may be accomplished by a preliminary period of rest and low protein diet. For example, in exophthalmic goiter, in which high pressure is the rule, rest and milk diet are useful in direct proportion to the severity of the case. Not only does such a regimen affect the pressure favorably, but it lessens, and this is of great importance in goiter patients, the thyroid toxemia. In nephritic cases these same measures accomplish a good deal. In all circumstances free bowel action tends to lower pressure. An interesting observation on prostatic cases comes from the Mayo clinic (D. C. Balfour, Mayo Clinics, 1913, p. 73). It has been found that the preliminary drainage of the bladder either by a retained catheter or by a suprapubic stab of the bladder lowers the pressure (in fifty cases on an average from 166 to 145) and cuts down the mortality to a considerable degree. Chilling must be avoided. In ether cases it causes a rise of pressure and congestion of the internal organs thereby predisposing to pneumonia.

The relation of *low blood pressure* to surgical conditions, like the whole subject of hypotension, is still very obscure. Only in connection with shock has much scientific work been done upon it. When in an adult a low blood pressure exists (a systolic pressure under 100) the margin of safety possessed by the circulation is small and a grave operation, unless extra precautions are taken, must end disastrously. I am sure a large number of this class of patients would not die if blood pressures were regularly taken. Under the head of low tension, we may consider shock, the salient feature of which is a great fall of blood pressure. Crile showed in 1903 (Blood Pressure in Surgery, Philadelphia, 1903) that this fall was due to exhaustion of the vasomotor center and not to any large extent to cardiac failure. It is of medical interest here to note that the work of the Leipsic school has shown that a similar pathogenesis underlies the circulatory failure in typhoid fever and other grave infectious diseases. In his more recent publications Crile (*Lancet*, 1913, II, p. 7) states that shock is accompanied by certain degenerative changes in the brain, the supposed result of so-called "noci impulses." The noci impulses are in a large measure preventable. They are for the most part psychic in nature, and while as a medical man it is not in my place to speak of the value of nerve blocking, I will say that from observation I am fully convinced of the inestimable benefits obtained by surrounding the patient before operation with an environment conducive to mental tranquility. I have seen a conscious patient brought into an etherizing room in which an assistant surgeon, with hands and gown covered with blood, was sewing up a gaping incision in the abdomen. The effect upon the patient can be imagined. Such things should not be.

I shall not enter here into a discussion of the relative merits of the theories advanced to explain surgical shock—those who are interested will find a lucid discussion of Henderson's acapnia theory and of Crile's views in the proceedings of the last (1913) International Medical Congress (*Lancet*, 1913, II).

Hemorrhage during operation, rough handling of the viscera, sudden changes of posture, prolonged operation and improper administration of the anesthetic, as every surgeon knows, make for fall in blood pressure, which will often pass unnoticed because the pressure is not taken. Ether itself, unless inordinate amounts are given, has a tendency to raise pressure (Guy, Goodall, and Reid, *Edinburgh Medical Journal*, August 1911) and would therefore be in all cases of hypotension the anesthetic of choice.

I have been much impressed with the recent suggestion of an English surgeon, who instead of waiting until the operation is nearly over before administering saline solution to combat a possible fall of pressure, starts the flow into the loose axillary folds with a Y-shaped tube at the beginning of the operation. He calls this the "axillary sup."

I have tried to point out as briefly as possible the bearing of blood pressure studies upon surgical operations and to show the factors of safety possessed by patients under varying conditions. If these factors of safety are not known, the surgeon may on the one hand undertake an operation from which he should keep aloof, and on the other hand, he may deprive a patient of the benefit of an operation which it might be safe to do.

1715 SPRUCE STREET.

TRANSACTIONS OF THE AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS.

Proceedings of the Twenty-seventh Annual Meeting held at Buffalo, N. Y., September 15, 16 *and* 17, 1914.

The President, CHARLES NORTON SMITH, M. D., *in the Chair.*
(*Continued.*)

EXTRAUTERINE PREGNANCY WITH A REPORT OF THREE UNUSUAL CASES.[1]

BY
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VOLUMES have been written from every view-point on the subject of extrauterine pregnancy. Scientific schools have taken sides concerning various phases of this subject, still open to debate. This short paper will merely classify and make more conspicuous the essential points that interest the abdominal surgeon. The writer will also report three unusual cases of ectopic gestation that he has had to deal with.

Burrage has aptly defined extrauterine pregnancy as, "the development of a fertilized ovum at some point between the Graafian follicle in which it originates and the uterus." The classification of ectopic gravidity is not constant with all writers. A simple and comprehensive classification is here given:

1. Ovarian pregnancy, when the ovum develops in the ovary itself.

2. Abdominal pregnancy. A primary abdominal pregnancy does not exist. It is either the result of a tubal rupture or abortion, slow in character, and in which the ovum continues to live.

3. Tubal pregnancy, when the pregnancy occurs in any portion of the Fallopian tube. They have been accordingly, tuboovarian pregnancy, tuboabdominal pregnancy, and tubouterine or interstitial pregnancy.

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[1] Read before the Twenty-seventh Annual Meeting of the American Association of Obstetricians and Gynecologists at Buffalo, September 15–17, 1914.

Pathological and clinical studies bear out the fact that gonorrheal salpingitis is the predominating cause of tubal pregnancy. The ascending gonorrheal infection attacks both tubes, as a rule. It is not unusual that one is called upon to operate for an ectopic gestation, say on the right side, and so find the left tube apparently normal. Later a pregnancy takes place in this tube. For this reason some surgeons, when operating for extrauterine pregnancy, remove both tubes.

Opitz, in twenty-three cases of ectopic gestation, found adhesions in nineteen, and kinks, constrictions, and subserous cysts in the remaining four cases. Ladinski, in a series of 150 cases, observed similar conditions. Ott and Peterson, in all of their cases, obtained a history of previous gonorrheal inflammation. Pelvic peritonitis, from any cause, both within and without the tube, may be regarded as a cause of extrauterine pregnancy.

Two theories have been upheld as the most frequent cause of ectopic pregnancy: 1. Mechanical obstruction by bands, adhesions, kinks, etc., and 2. Pathological and physiological changes in the tubal mucosa. Virchow, Martin, Wyder and Schauta upheld the former theory; laboratory experiments on animals by Lataste, Mandl and Schmidt disproved the latter.

In the severe forms of gonorrheal salpingitis uterine or extrauterine pregnancy are impossible. It is the mild or catarrhal forms of salpingitis that predispose to ectopic gestation. After the active inflammation subsides it is found that the cilia of the epithelial lining of the tubes are lost. R. R. Huggins claims he never found ciliated epithelium in a tube the seat of a salpingitis or pregnancy.

Schroeder, Tait, Veit, Wyder, and Bandler regarded the absence of ciliated epithelium as the most potent cause of tubal pregnancy. Abel and Freund, and others, advance the theory that infantile Fallopian tubes, whose lumen are too narrow to permit of the passage of the ovum, is a cause of tubal pregnancy. Tumors, such as polypi of the tubal mucosa or fibromyomata situated in the interstitial portion of the tube, may act as mechanical obstructions and cause the ovum to remain in the tube. Reports of such cases have been added to the literature in no small number. Atrophy of the tube due to hyperinvolution or lactation, which diminishes its motile and contractile powers, is considered a cause of ectopic fetation. External migration of the ovum is looked upon as a common cause.

The theory, that an ovum, originating in a diseased ovary, is discharged minus its discus proligerus the cells of which are supposed to be endowed with the property of preventing adhesions between the ovum and the tubal mucosa, is probably, "too phantastic" to be considered a cause of tubal pregnancy. Tubes diverticula has been given as a cause of this condition.

The author has found no reference as to predisposition to ectopic pregnancy in certain races. He has observed, however, that the Slav people are prone to this condition. This is merely a personal observation and is here stated only for what it may be worth.

In the light of our present knowledge of extrauterine pregnancy a diagnosis should be made in 80 per cent. of all cases before fatal rupture of the gestation sac and collapse of the patient takes place. Unfortunately the surgeon is not called to attend the case, in a very large per cent. of cases, until the so-called "tragic stage" has been reached.

There are two symptoms of cardinal importance in this condition: 1. Atypical menstruation, or metrorrhagia; and 2. Pain, typical in character.

Philander Harris puts the gist of this subject into a few words when he says, "When any woman after puberty and before menopause who has menstruated regularly and painlessly, goes four, five, six, eight, ten, fifteen to eighteen days over the time at which menstruation is due, sees blood from the vagina differing in quality, color, quantity, or continuance from her usual menstrual flow, and has pains, generally severe, in one side of the pelvis or the other, or possibly in the hypogastric region, ectopic gestation may be presumed."

The previous history of the patient is important. The marital history may shed great light on the case. It is essential to know whether the woman has been sterile or presents what is called "the one child sterility."

The vaginal bleeding is peculiar. It has a sort of slippery consistency, and at times a diagnosis may be made from the "feel" of the blood. The color of the blood is characteristic. In a majority of cases it is a maroon color. The blood may be tinged with a leukorrhea or, in rare instances, be of a bright red.

The findings in Douglas' pouch are also characteristic. The clotted blood causes a doughy mass which has a peculiar, crepitant feel. Oastler draws attention to the fact that, in cases presenting pelvic inflammatory disease, the uterus is usually retroverted; whereas in ectopic pregnancy it is, as a rule, anteverted. When the extrauterine pregnancy has advanced the uterus will, nearly always, be found displaced laterally away from the gestation sac.

The ovum or escaped blood act as foreign bodies and the tube, in its efforts to expel the foreign hosts, gives the symptom of pain. The pains occur at intervals and may extend over a period of several weeks before the fatal rupture. There may be an escape of blood into the abdominal cavity with no definite symptoms. Blood coagula and free blood may be found in the abdominal cavity in cases where rupture has not taken place as for instance in cases of tubal abortion. In some cases there is no history of hemorrhage or pain previous to a severe attack of abdominal pain followed by collapse.

In extrauterine pregnancy the breast signs are usually negative. The softening of the cervix is not so marked as in uterine gestation. The uterus is enlarged but does not correspond in size with the duration of the ectopic ovum.

In the nontragic stage the temperature and pulse are not very significant. When a sufficient amount of blood has escaped into the abdominal cavity there is a moderate elevation of temperature. one or two degrees, and an increase in the pulse rate. The tragic stage is marked by severe colicy pains, weak and rapid pulse, subnormal temperature, pallor of skin, vomiting, indeed by all the symptoms of shock. Not infrequently the patient is in a semicomatose condition from which she is easily aroused.

To quote Burrage, "No disease produces in the pelvis such a variety of conditions to be palpated by examinating fingers and hands as does ectopic gestation." Before rupture a diagnosis is comparatively easy. After rupture the diagnosis presents difficulties and is not so readily made.

If the symptoms present make us suspicious of the existence of a ruptured ectopic gestation, but that we cannot be positive of our diagnosis, the cul-de-sac may be incised with little risk, and if the peritoneal cavity reveals the presence of blood, a positive diagnosis of this condition may be made. One point must be kept in mind, however, when the surgeon opens Douglas' pouch—if the case is one of ectopic gestation, the larger operation of opening the abdomen must follow immediately.

We may say then, that a woman, previously regular in her menstruation, giving a history of having missed a period which was followed shortly by a peculiar vaginal bleeding, with pain and a growing fluctuating tumor painful to the touch, the diagnosis of ectopic pregnancy may be presumed.

It is still debatable as to what is the best time to operate in case of rupture. Some urge an immediate operation; others wait until the patient has recovered from the shock. The writer's rule is to operate as soon as the diagnosis has been made. If, however, the patient is in extreme shock with a low blood-pressure we do not operate. We Trendelenburg the bed and administer morphine. When the blood-pressure rises and the general condition has improved we open the abdomen. We do not, however, wait for the blood-pressure to return to normal. It has been our custom to practice transfusion, if required, and not infusion. The reason for this is obvious. For four years we have had no mortality.

Marvel reasons as follows: "Hemorrhage and sepsis are the cardinal symptoms of ectopic gestation. Sepsis is never a primary trouble. Its activity is engrafted upon a preexisting hemorrhage, which is the result of a ruptured gestation sac. Sepsis is secondary; hemorrhage primary. In order safely to combat them, it is necessary to remove the underlying cause. To prevent sepsis is to prevent hemorrhage. When hemorrhage is evident, the only dependable means to secure control is to ligate the vessel approximate to the bleeding orifice."

Ovarian pregnancy offers symptoms different from tubal pregnancy. Uterine bleeding is not a constant factor. There is a history of amenorrhea. Hemorrhage in these cases is not as common as in tubal pregnancy. Pain is the rule, but it may be absent. To quote Ingraham: "The diagnosis presents the same difficulties as tubal pregnancy, and to my mind the differentiation is practically impossible. At best we can only suspect the condition." The writer has three uncommon cases which he deems of interest to report.

CASE I.—Mrs. B., æt. thirty-two. Housewife. Family and personal history of interest. Married when nineteen years old. Sixteen months after marriage she gave birth to a child; three years later to another child. Both are still living. A year later she aborted at two months ovum. Two and a half years after this, she miscarried when five months fetus. The last miscarriage was the result of scarlet fever.

After the first abortion she had more or less of a profuse vaginal discharge. After the last miscarriage she was separated from her husband. She became twice pregnant thereafter and had criminal abortions performed.

The writer was called to see this patient on February 17, 1912. Believing herself pregnant, she consulted a physician who curetted her. After the curettage she suffered severe and increasing pain in the right lower abdomen. The uterine bleeding did not stop. The lower abdomen was tender. The uterus was slightly enlarged and a mass was left to the right of it. The vaginal examination was very painful. The temperature 99.3, the pulse 88. Hemoglobin 90 per cent. No blood-count was made. Diagnosis: Postabortal infection. The usual routine treatment in these cases followed.

For four days the temperature fluctuated between 99° F. and 100.4° F., the pulse ran from 84 to 102. The bleeding from the vagina continued but became less offensive. The abdominal pain and tenderness on palpation continued to increase.

Patient was sent to the Williamsburg Hospital. Shortly after her arrival the pain suddenly grew less, the pulse rose to 114 per minute, and the temperature dropped to 97.3° F. The patient was extremely prostrated. The writer called in Dr. H. A. Wade, and a diagnosis of a ruptured tubal pregnancy was made. The operation confirmed the diagnosis. The right tube was removed. The left tube was in poor condition and was removed. The uterus was adherent to the sigmoid and a loop of the small intestine. Fearing to light up fresh trouble, we did not free the adhesions. The abdomen was closed without drainage. The patient made an uneventful recovery. Since the operation she had been far from well.

CASE II.—Patient aet. thirty-one. Housewife. Married eleven years. The writer first saw the patient when she was suffering from a mild attack of salpingitis. She began to menstruate at fourteen, and was regular until about six months after her marriage. The husband confessed having had gonorrhea three years before he married.

Two years after marriage the patient had a premature birth, due to a fall from a chair. Two years later she gave birth to a full term and living child. Three years later she miscarried a three and one-half months twin ovum.

Since the birth of her first child she has suffered from pain in her left side. Her menstrual type changed and ranged from twenty-five to thirty days. The duration of flow, two to six days. Pre and co-menstrual pain lasting from one to three days. She was decidedly neurotic. Vaginal and cervical smears negative.

May, 1913, the writer dilated the cervix, iodinized the endometrium, repaired a bilateral laceration of the cervix, and repaired the perineum. The cervical discharge was lessened, but the pain on the left side continued.

August 16, 1913, she consulted me stating she was "long over time." She felt sure she was pregnant. The uterus was slightly enlarged and fixed in a second degree retroversion. On August 18th I was sent for and found her suffering from severe pain on the right side in addition to the old pain on the other side. Upon digital examination the writer felt a tender mass to the right of the uterus, and still further to the right a harder mass, about the size of a small olive, which was also quite tender to the touch. At this time her temperature was 99.2° F. and pulse 84. She was kept in bed. The usual medical treatment for a salpingitis was carried out. The next night she began to bleed moderately from the uterus. The pain on the right side increased in severity and made a vaginal examination very painful.

These symptoms continued for four days. The temperature did not exceed 100° F., nor the pulse 96 per minute. August 24th the suffering was intense. Diagnosis: Ectopic pregnancy. She was transferrred to hospital.

While being prepared for the operation she suddenly went into collapse.

A few clots and free blood were found in the abdominal cavity. The sigmoid was adherent to the right side of the uterus as well as the tube and ovary. The left tube was inflamed. After freeing the adhesions the right tube was removed, the uterus suspended, and the abdomen closed without drainage. Recovery was uneventful. Patient left the hospital sixteen days after the operation.

This patient suffered from nausea which medication did not relieve, three days before leaving the hospital. The nausea continued for ten days after her departure. On two occasions there was morning vomiting. She believed herself still pregnant. On the twelfth day she was taken with uterine pains and began to bleed per vagina. She said she passed some "pieces." An examination revealed a soft cervix dilated sufficiently to admit one finger. The cervix and vagina were packed with sterile gauze. The packing was removed the next day. The bleeding continued and that night she passed what looked to be placental tissue. Unfortunately, this was not saved for microscopic examination. No fetus was passed, and the bleeding stopped. There was a vaginal discharge of a brownish color but without odor. Seven days later she was about again.

This case is interesting inasmuch as the fetal sac was found and removed per abdomen. What passed from the uterus is a matter of doubt.

Case III.—A service case at Williamsburgh Hospital. Polish girl, aet. twenty-five. Factory worker. Removed to hospital in ambulance. Previous history unsatisfactory owing to fact that patient could not speak English. From what could be learned from and determined upon physical examination, a diagnosis of an unruptured right tubal pregnancy was made.

At the operation the abdomen was found full of blood coagula and a small amount of free blood. A mass in the right tube, measuring about three-quarters of an inch in all directions, was discovered. Left tube normal. Uterus freely movable. Right tube extirpated. Uterus suspended. Abdomen closed without drainage. The patient made a good recovery. The specimen removed was examined and proved to be a pure blood clot. No fetal structure could be discovered. The coagula and free blood in the abdominal cavity must have been expelled from the distal portion of the tube. A hematoma of the tube is not so rare as to excite comment. In this case the physical findings were those of an ectopic gestation.

THE CLINICAL AND PATHOLOGICAL FEATURES OF CHORIOEPITHELIOMA MALIGNUM.*

With Report of Three Cases.

BY
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The report of a few cases of the condition under consideration, and the discussion of their clinical and pathological features, needs no apology. Its justification lies in the fact that there have been, after almost twenty years of investigation, only a few hundred cases of the disease described and discussed. Historically the condition is of great interest. One generation ago the disease was practically unknown; or, if recognized, was not differentiated from other malignant diseases of the uterus. When we realize that this is a concomitant of either the pregnant state, the blighted ovum or the cell inclusion in the embryo, where the host—be it the mother or the child—is in imminent danger of dissolution by the parasitic overgrowth of a physiologic cell formation, where no one can definitely state when the bounds of safety have been crossed, the subject becomes full of tragic possibilities and one whose existence must be always in the mind of the wideawake obstetrician, gynecologist and surgeon.

"Since greater watchfulness has been exercised toward the outcome of hydatid moles, postabortive hemorrhages and other pathological puerperal conditions, an increasing number of cases of chorioepithelioma have been reported in America. The comparative rarity of the disease permits few men to observe more than one or two cases in a lifetime. Many physicians have never seen it at all. In spite of this infrequency the high rate of mortality, incident to this form of tumor, makes it necessary for everyone who practises either gynecology or obstetrics, and this will embrace the great majority of all medical men, to be in a position to recognize the pathological condition at the earliest possible moment. (Franke)."

Despite the rarity of this disease, the literature has become

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extensive and voluminous and in the confines of a paper of reasonable length it will be impossible to touch all the various phases of the subject. Aside from a brief animadversion to them such subjects as the metastases in various organs, inclusions in teratomata in males and females, and the polemics as to the origin of the component cells, will have to yield to more extensive discussion of more practical themes. It is, likewise, not feasible to review the various classifications and their rationale, as given by the earlier and the more recent writers on this subject, yet it will be necessary to follow step by step the historical evolution of our present teachings in the tumor under consideration, and to show, as A. L. Benedict (*Am. Med.*, April, 1907, IV., N. S. No. 4), has pointed out, "that the conception of chorioepithelioma has developed in logical and approximately chronological sequence along the following lines: 1, that hydatiform mole was something more than an unremoved placental mass; 2, that true tumors might develope in the uterus or at the site of an extrauterine pregnancy; 3, that these tumors were not merely caused by retained products of conception or by resulting inflammatory reaction acting as an irritant, but that the essential tumor cell was derived from the decidua; 4, that such tumors could not only extend but give rise to genuine metastases; 5, that similar tumors might arise so long after pregnancy as to show that the process could not be regarded as a slow but direct progress of a condition begun during pregnancy, but that there had been a latency of neoplastic cells; 6, that chorioepithelioma could occur as a primary tumor apart from the site of gestation, for instance in virgins and males; 7, that while, apparently, primary tumors developing in a woman, who could be suspected of having been pregnant, might be explained on the basis of latency and metastases, its occurrence in a young girl, and *a fortiori* in a male, could be due only to some form of teratomatous deposit."

History.—Chronologically our knowledge of chorioepithelioma starts with a paper by Marchand, although Sanger, Pfeiffer and others had described the tumor under the appelation of deciduoma and sarcoma deciduo-cellulare several years before. Later the works of Teacher, Riesel, Ruge, Eiermann, Fraenkle, Schmauch, Veit, Polano, Gaylord, Briquel, Franke, Ladinski and Ewing were the milestones in our progress in the elucidation of this complex subject.

Etiology and Histo-Pathology.—Under this heading we must enter a field where there are many unsettled questions, where often both disputants have equal rights to their opinions and where either hypothesis is equally defensible. To understand it correctly the necessity of a casual review of the normal ovum implantation arises, and immediately there confronts us the dispute as to the interrelation of maternal and fetal tissues, the origin of the syncytium, and the mode of formation of the intervillous interstices. No matter however to which school one favors allegiance, many points are equally cogent in the other and up to the present this question is debatable. However the facts, as the microscope shows them, remain no matter how we interpret them; and, to my mind, the facts as I have been able to sift them below cover the field widely enough that the finer points awaiting settlement in the pathologists laboratory may be for the present disregarded and a working hypotheses be elaborated from the truths in both teachings.

For the adherents of the fetal origin of the tumor under consideration Bandler, in his very illuminating article, is able to lay down following theses: "Tubal and uterine ova furnish us with the following positive conclusions. 1. That the human ovum possesses an ectodermal growth of cells, the trophoblast, consisting of closely grouped cells. 2. When vascularized, a second external layer, consisting of plasmodial mononuclear and polynuclear elements results. 3. Elements of the blood circulating in the spaces and the lacunæ of the trophoblast contribute to the protoplasm of the syncytium. Among other elements, the secretion of the uterine or tubal epithelium may likewise contribute to the formation of syncytial protoplasm. At any rate, much of the protoplasm (but none of the nuclei), is of maternal origin. 4. On the villi and the membrana chorii the plasmodial cells form the outer syncytial layer, while the closely grouped cells beneath it furnish the single layer of Langhans. 5. The stroma of the chorionic villi is formed of mesodermal tissue in which are later found capillaries communicating with the umbilical vessels and containing fetal blood. Clear in almost every detail then, a trophoblast formation, consisting of an inner layer of separated cells and an outer or plasmodial layer such as is found in the placental development of animals, is found present in human placentation."

In the very early ovum such as described by Peters and Spee, this double layer of cells, covering the chorion and its villi are identified. From a cross-section of such a villus, the findings in hydatiform mole and the typical chorioepithelioma malignum, to reconstruct the successive histologic and pathologic steps does not consume a prodigious stretch of intellect or imagination. In its simplest form, the villus may be described in cross-section as consisting of a central core of jelly-like, myxomatous, embryological construction, with transitional, formative blood-vessels, and held together by an ill-defined membrana chorii. Intimately connected with this and seated upon it is a definite and once seen, unmistakable layer of large well-defined polyhedral cells with a single nucleus of large dimensions. Over this is a multinuclear protoplasmic layer of cells, the individual bodies of which are very poorly or not at all defined but have the characteristic of a very intense staining with most stains. These two, the former called the Langhans cell, the latter the syncytial, while they are the normal constituents of the placenta, are the elements that go to make up in one way or another the hydatiform mole, the benign chorioepithelioma,the malignant chorioepithelioma, the metastases in the various organs and in the teratomatous deposits, when different degrees of riotous hyperplasia occur. To understand their action we must become cognizant of the way both cells which make up the trophoblast are alleged to act and here we enter into the territory of dispute again. The upshot of it, however, is this. Histological examination of any section of chorionic implantation reveals the fact that there is always distinct evidence of the destruction of tissue in the environment of the chorionic villi and cells; Minot's "Hypertrophic degenerated trophoblastic cells" are in the interstices between broken-down muscular tissue and the free blood shows that there is an active destruction caused by their presence (Digestion, Bonnet terms it). This is sometimes markedly accentuated in ectopic implantation of the ovum; and in its pathological aspect the invasion of the trophoblastic layers, either as placentary polypi, as hydatiform mole or as true chorioepithelioma is easily understood. The disputed question arises from the fact that something in the normal mother evidently holds this invading power of the trophoblastic cells in check and the assumption of some form of protective force in the tissue of the host becomes reasonable. This may be a syncytiolysin or some other function in the mother's body that overcomes this proliferative tendency of the trophoblastic cells of the fetus. For Marchand points out the normal "transit" must cease with the death or blighting of the ovum or the tearing away of some of the chorionic villi and thus the normal metabolism and growth of the cells are violently disturbed. What follows is that the epithelium which shows great power of independent growth at all times, continues to be bathed by a large amount of blood in the maternal sinuses; proliferation continues unabated and the cells increase their normally inherent destructive power on the environing muscle tissue. There is probably also a partial reduction on the part of the mother of her power to curb this activity. The puerperal tissue is sodden with serum and the muscle fibers are pushed apart and partly destroyed, and the interstices offer much more unusual facilities for the growth of the villous columns than the tough and close-grained tissue of the nonpregnant womb. The question therefore arises why does not every ovum produce the destruction of its host and is answered by the fact that not only has spontaneous healing by destruction of the invading cell masses been observed but Veit claims to have found antibodies in the pregnant woman's body and based on this Schmauch explains the cessation of the proliferative tendencies on the basis of the side-chain theory of Ehrlich. However, whatever the reason, it is certain that while usually the normal implantation of the ovum is safeguarded by something that limits the extensive proliferation of its trophoblastic cells; yet when the ovum is blighted or for any other reason the trophoblastic layer becomes luxuriant and cells run riot through normal tissue, then the hydatid mole or the chorioepithelioma results; and when it takes on metastatic tendencies, is washed by the blood stream to the lung, liver, brain or vaginal tissues, it may grow in these other organs and leave nothing to show its original site, then the adjective malignum can be justifiably added.

For clinical results have forced us to differentiate between benign and malignant chorioepithelioma and the pathologist's classification has had to submit to the same differentiation, based on clinical findings.

Ewings classification will be gone into later as the one that takes cognizance of this fact; Schmauch's may be mentioned here as a working basis for description. He classes all cases as "typical" chorioepithelioma where the tumor "presents a well-defined structure which resembles the epithelial cover of the villi in early stages of placentation; Langhans' cells, permated and surrounded by syncytium and plasmodial masses resembling the syncytial buds of the villi;" his second, a "atypical," class of chorioepithelioma, as he says better termed, deciduomata is mainly differentiated by the presence of the decidua cells in preponderance. This looks the more destructive and of greater malignant tendencies in its effect on the maternal tissues yet withal it is less treacherous than the typical form. The third class is practically a "transitional" one where the syncytial cell predominates in groups with occasional Langhans' cells interspersed. Histologically all the types impress us with their malignant possibilities but the more frequently we have the reports lately of recoveries with and without operative interference the more it almost forces us to differentiate between normal and abnormal trophoblastic activity in every, even the normal appearing ovum.

As was said above, the classification of the trophoblastic tumors under consideration, as given by Ewing, has the triple advantage of, first, offering a working pathological classification; second, the findings as grouped admit of a prognosis based on good reasoning, and, third, therefore serve as a rationale for conservative or radical operative interference. It may be well to briefly review his views. First he recognizes the important relation of the hydatid mole to the choriomata; and based on the amount of the proliferative tendencies exhibited by the cells of the two layers of the trophoblast, the prognosis and the indications for more radical steps are formulated. All in all, however, the course in the condition is favorable. The second group includes the typical chorioepithelioma of Marchand. This he calls "the mildest type of a genuine neoplastic process in the chorionic structure"; and names it from its histological characteristics and its distinguishing clinical features chorioadenoma destruens. Reproducing in an orderly fashion all the structures of a normal villus; extending into the broad ligament and into the vagina, not given to general metastases; constantly characterized "by orderly branching buds of vacuolated syncytium and sharply defined Langhan's cells which show no pronounced metaplasia nor morphological variation from the normal type." He justifies the distinction of this group for practical reasons; inasmuch as it offers a more hopeful prognosis than any other form of choriomata. The third group is what Marchand called the malignant chorioepithelioma but which Ewing prefers for various cogent reasons to call the choriocarcinoma. Here the orderly neoplastic condition of the tumor constituents is lacking, and "very extensive proliferation and pronounced metaplasia of Langhan's cells and syncytium" is the rule. "The tumor cells in this group exhibit a remarkable capacity for independent growth apart from villi, show an advanced metaplasia and in the metastases a striking loss of differentiation. They grow diffusely, failing to show the orderly arrangement or polarity of the milder forms of choriomata." Their histological characterization and their gross characters are quite different from the chorioadenomata." "The tumors in the uterus are comparatively small, or may even be missing in the uterus, but numerous metastases are found in the lungs, spleen, brain and other organs." "The prognosis must in these cases always be unfavorable and in the great majority prove fatal in spite of early operation," although a few have been known to recover. The fourth group, corresponding to Marchand's atypical chorioepithelioma, he gives what seems to me a much better name, viz: syncytial endometritis. The distinctive features of this variety is the "absense of the actively proliferating syncytium and Langhan's cells, but an extensive infiltration of the uterine muscle and the sinus walls with a large number of large or giant mononuclear cells, derived from the syncytium." "When they are exclusively present and chiefly within the muscle, they constitute the atypical chorioma of Marchand." These cells are looked upon as a normal concomitant of every pregnancy, most marked in the early months up to the sixth month "but may be entirely missing in the uterus at term (Meyer)." Clinically "in the gross the uterus is much enlarged, often to greater dimensions than are seen with other forms of chorioma"; the growth arising either from a large area, involving most of the endometrial surface, or from only a small area of the mucosa. "It may produce one large intrauterine mass or more often appears as irregular globular masses surrounding the enlarged uterine cavity." It is doubtful if it ever perforates the uterus or that "general progressive metastases ever occur from this type of chorioma." When, however, the process under consideration takes on more of neoplastic phase, the group can then well be termed syncytioma, combining the various transitional types met with between all the various groups above identified. "For," says Ewing, "it is probable that there are all gradations between choriocarcinoma or adenoma and syncytial endometritis, and that the transition is marked by progressive increase in the proportion of syncytium and decrease of Langhan's cells, while at the same time the proliferating syncytium is gradually replaced by syncytial wandering cells."

The biological classification of the chorioepitheliomata offers less difficulty. As stated before, Sanger and Pfeiffer looked upon the condition as an aberrant sarcoma; and the title, deciduo-sarcom and sarcoma deciduo-cellulare were kept in Germany from 1888 to 1893, when Gottschalk from a more careful study decided to call the tumor sarcoma chorio-cellulare; a year later Fraenkel, finding nothing of a sarcomatous nature in the stroma of the tumor and that it was purely of epithelial origin, contended that the tumor was a sarcoma. Marchand's classical work in 1895 gave it the definite name of chorioepithelioma malignum, to describe a tumor which "originated at the point of placental insertion from the syncytium and Langhan's cells of the chorionic villi; and consists of interwoven masses of cells and protoplasmic masses, containing neither connective tissue substance nor blood-vessels, but often areas of necrosis." (Pierce.)

In 1896 the committee appointed by the Obstetrical Society of London, to decide the status of Marchand's tumor reported categorically that it was a sarcoma, and this attitude did much to hinder the progress in the study of this tumor; and Veit as late as 1902 contends that the cells called Lanhang's cells are decidual cells which have undergone a sarcomatous degeneration and that the syncytial elements may be formed from other cells or tissues when influenced by pregnancy and are not necessarily derived only from the chorionic epithelium. However, Teacher's valuable contribution in 1903 served to straighten out the contraversialists and the valuable work of Webster has added many cogent arguments to the settlement of the question. But at the end of all, it remains to follow the classification of Adami, which recognizes the condition as a new pathological entity and places the hydatid mole and the chorioepithelioma in the class of teratogenic blastomeres, acknowledging the constituent cells to be derived from another individual, therefore as truly parasitic as the teratomas and terato-blastomas.

As to the etiology, the figures gathered by Pierce combining those of Strogonowa, Spencer, Pick and McKenna show that in a total of 176 cases, chorioepithelioma followed hydatid mole 77 times, normal labor 36 times, abortion 20 times, and tubal pregnancy 4 times. This is about the proportion later writers find; as embodied in its definition then, chorioepithelioma usually finds its greatest etiologic factor in the pregnant state; of course, this does not take in those cases where it is claimed there is blastomeric inclusion in teratomatous deposits in the bodies of males or of such females where pregnancy can be totally excluded. Concerning this we shall speak briefly later.

All varieties of anatomic distribution of these tumors have been described. The most frequent, of course, are those where the site of the tumor is limited to the uterus and adnexa; and in Ewing's classification above, the usual findings have been detailed. To illustrate by typical case, I have selected from the American cases collected by Frank the cases of W. McDonald (*Am. J. Gyn. and Obst.*, xix., 205, 1901) and that of L. J. Ladinsky (AMER. JOUR. OBST, xlv, 465, 1902). The first was a woman of thirty; para-iii; last pregnancy five months before; was supposed to have miscarried, now at second month; three weeks later curetted for bleeding; again curetted one week later and "placental tissue" removed. One week after last curettage a severe hemorrhage followed; a pedunculated vaginal tumor was noted;

the os was patulous, and a conical growth projected from the fundus. Death from hemorrhage. No autopsy. The tumor tissue showed typical chorioepithelioma.

The other case occurred in a woman of nineteen, primipara, after delivery of hydatid mole, repeated curettages failed to stop the bleedings. The uterus was felt enlarged, the os patulous, bilateral ovarian cystomata the size of a fist; abdominal panhysterectomy. The uterus contained a nodule of typical chorioepithelioma. These will serve as type cases for this anatomical division of the clinical manifestations.

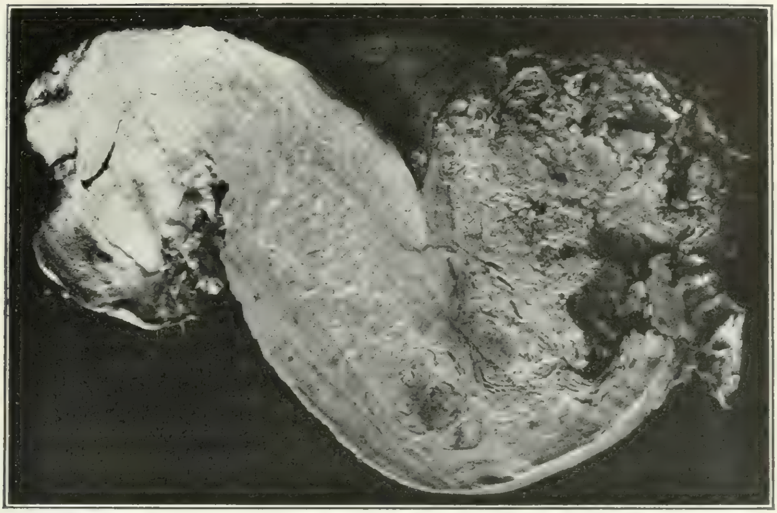
Rather more baffling are the cases reported where the vaginal nodules are the first cause of the patient's seeking medical attention; and where the uterine condition may be nil even. As a type of this sort of condition the case of Hicks (*J. Obst. and Gyn. Brt. Emp.*, vol. vii, Aug. 2, 1907) is chosen. A woman, twenty-eight years old, para-iii., had amenorrhea for seven months; then passed a hydatidiform mole and a five-month fetus. A month later there was a blood-stained discharge. The uterus was found subinvoluted and there was a tumor in the vagina, which on removal proved to be a typical chorioepithelioma. Five months later another was again removed from the vagina and then a third in six weeks. This recurred soon after and the patient died eleven months after the expulsion of the mole. At autopsy the uterus had no growth in it; there was a slight metastasis in the right lung. Ovaries contained lutein and blood cysts. Hicks concluded that the vaginal growth arose from the epithelium of embolic villi, spreading along perivaginal spaces.

As was mentioned before in Ewing's classification, certain classes of cases of chorioepithelioma seem to possess a remarkable malignancy; sparing practically no vital organ from metastatic deposits. For instance, in the typical case reported by Anspach and Alburger (*Am. J. Med. Sci.*, March, 1908), M. H., aged thirty-one years; para-vii, was admitted to the hospital February 11, 1905. Her youngest child was two years old. For the past three weeks she had had a white discharge streaked with blood; for the last week this was dark red and of foul odor. She passed many clots. She was emaciated, anemic; her hemaglobin equalled 50 per cent. Her uterus was the size of a three months pregnancy. Digital and instrumental removal of what was taken for placental tissue but on histological examination proved to be a typical chorioepithelioma. Panhysterectomy was done. Death after six weeks. At autopsy metastases were found in the pelvic peritoneum, in the pelvic, lumbar, bronchial and retroperitoneal lymph nodes, in both lungs, the pleura, kidneys, liver, pancreas, and in the left pectoral muscles.

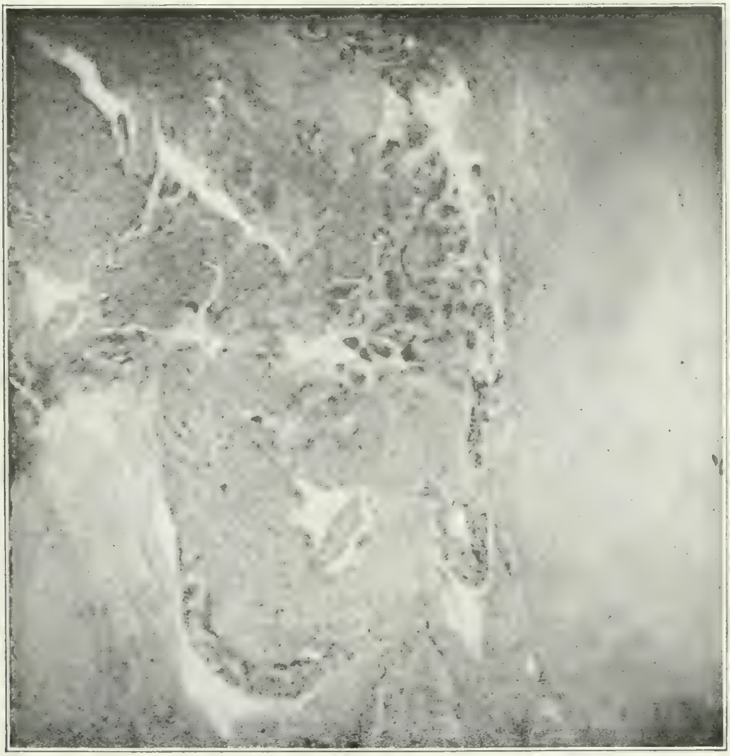
It must not be forgotten that hydatid degeneration has been described in ectopic gestation and naturally there is, while the condition must be rare, no absence of reports of chorioepithelioma in tubal pregnancy. The classical case is that of Vossmer (*Path. Anat. Arb. Festschr. f. Orthop.*, 237, 1903) who reported a case where a vaginal metastasis first attracted notice to the condition existing in the abdomen. Naturally cases such as these, simulating and being diagnosticated as ectopic gestation, are also recorded.

There remains to briefly discuss, that class of cases, the description of which for a time served to muddle the histopathology of this tumor most effectually. Pick reported finding in a girl of eight and one-half years of age, who had never menstruated, a chorioepithelioma, proving thus that this may occur in teratomata of the female as well as in the male, for typical chorioepitheliomatous masses had been found by Rosthorn in teratomatous brain tumors in a thirty-year-old man, at operation. While at autopsy later metastases were found in the retroperitoneal lymph glands, lungs, liver, and kidneys; the testicles were without any neoplasia. Based on such findings, Schlagenhaufer and Huebl argued that there was no such specificity to the chorioepithelioma which Marchand had described; but Riesel successfully combatted this by showing that in reality the malignant chorioepithelioma of the pregnant or parturient woman, and the choriomoid proliferations as found in such cases as Rosthorn's above could not be identical in any way and certainly not as to genesis. He identifies the more or less extensive chorioepitheliomatous deposits as part of a teratoma, in which search would reveal evidences of the other layers; and when only the ectodermal layer can be identified, it is still probably a teratomatous growth in which the one tissue constituent has crowded out all the other layers and had a one-sided development only. This would be accounted for by a growth and inclusion of fetal ectoderm, which might cause a pure teratoma, or by excessive overgrowth in one direction of a totipotential cell, the tumor resembling chorioepithelioma; and would not necessitate the assumption of a distinct inclusion of trophoblast cells in the growing fetus. In other words, Pick (*Berl. Kl. Woch.*, 1902, v, 1198) has well differentiated between the conditions, by saying, "chorioepithelioma and hydatid mole are to their hosts in the relationship of descendants; the chorioepitheliomata found as teratomata are to their hosts in a consanguineous relationship."

Before touching on the question of diagnosis, the clinical histories



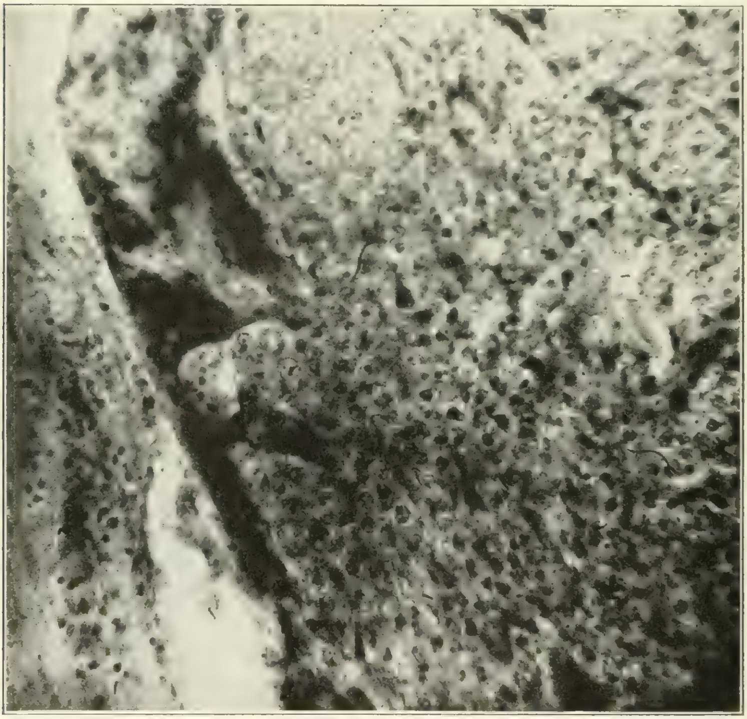
Cross-section of uterus and tumor mass in Case I. Note smaller forms below main tumor.



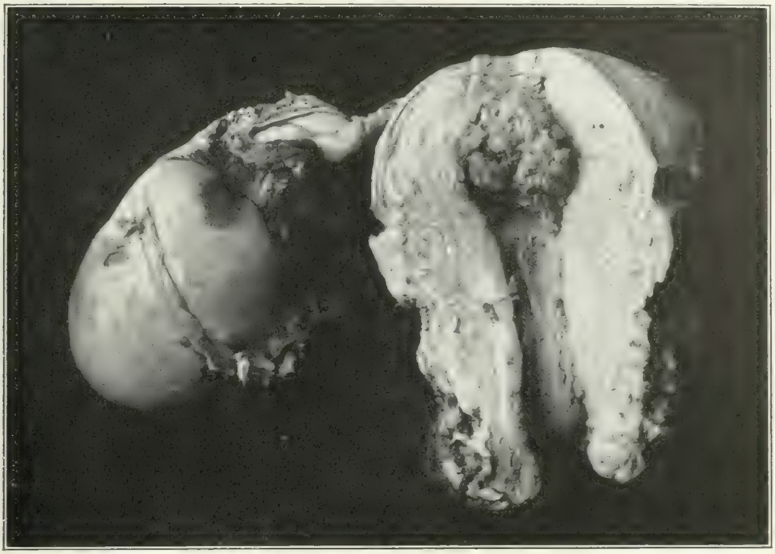
Low-power photomicrograph of Case I.

of the three cases I wish to report in this paper may help to bring out the salient features upon which the diagnosis of these cases is formulated.

Case I.—E. V., admitted to service of Dr. C. L. Ill at St. Michaels Hospital, July 6, 1908. She was an Italian forty years old and married. She had born four children at term and had had two miscarriages, the last one a two months' fetus, in March previous. She flowed interruptedly to June 13, when she was curetted; but after a few days started to flow again, so that when curetted on July 4, once more, and large masses of tissue simulating placenta were removed, the diagnosis was made and corroborated by the pathologist, chorioepithelioma malignum. Consent for a panhysterectomy was gotten and July 31, I operated on her. She did not survive the operation. Autopsy refused. Description of tumor: Uterus was about the size of a four and a half months' pregnancy. The fundus was practically eroded through by the tumor mass. Cross-section showed a large globular mass in the wall of the uterine fundus, softish



High-power photomicrograph of Case I. The abundant syncytial masses are well shown here.

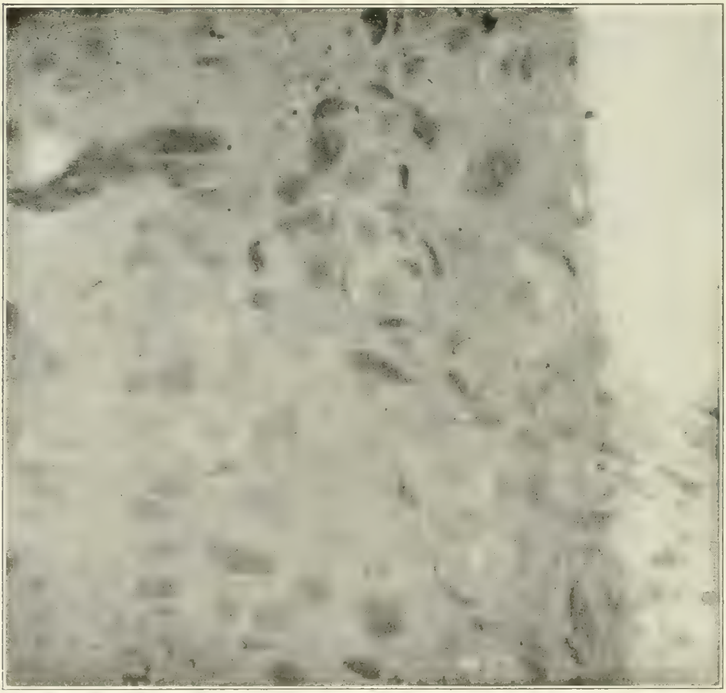


CASE II. Note typical lutein cyst of ovary.

Low-power microphotograph of Case II.

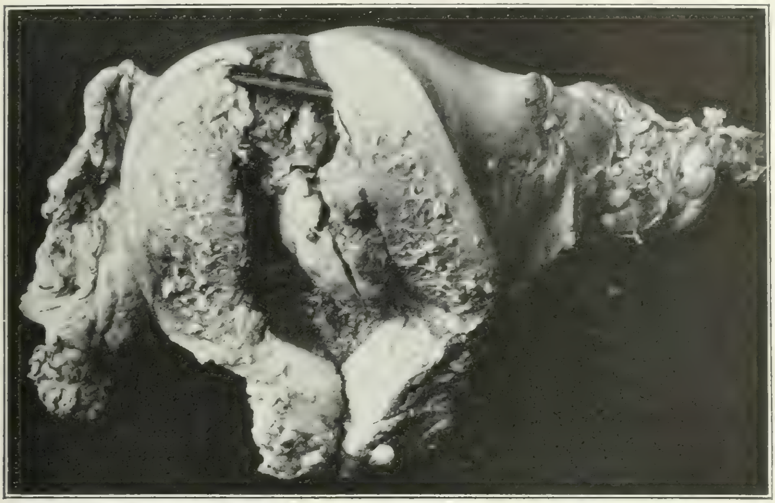
in character and purplish red in color with patches of yellow here and there. The actual measurements of the uterus were 8 cm. × 8 cm. at the fundus and 17 cm. from cervix to fundus. The main tumor mass had a diameter of 7 cm. The accompanying photographs and photomicrographs show the character of the tumor and the pathologic elements of the tissue composing it.

Case II.—M. R. was admitted to the service of Dr. Chas. L. Ill at St. Michaels on Feb. 7, 1911. She was nat. U. S. A.; forty-two years old, married for thirteen years, had had three children at term and one miscarriage, at two months, last November. She had been ill since that time. Her previous health had always been good.



High-power photomicrograph of Case II.

Two weeks after her abortion because of constant flowing she had been curetted; as she started to flow again three weeks after she was again curetted. Four weeks after this curettage she began to flow again and has been flowing for the past four weeks preceding admission. Examination showed moderately enlarged, soft and boggy uterus. Hysterectomy advised and accepted. I removed uterus and adnexa *en masse*. Description of tumor: Uterus measures 6 cm. × 4 1/2 cm. at the fundus and 8 cm. in length. The tumor mass of chorion-like tissue in the fundus about the size of a walnut was also of that shape. Right ovary about the size of a duck's egg

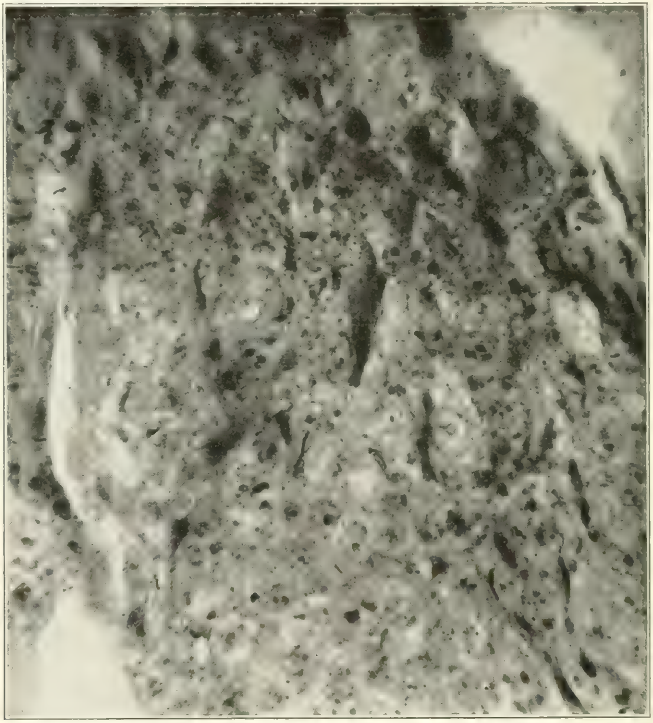


Case III. Typical choriocarcinoma.

Low-power microphotograph of Case III. Choriocarcinoma.

and containing typical lutein cyst. Microscopically the tissue was typically choriocarcinoma. The patient recovered nicely from the operation and is living at present.

Case III.—Patient an inmate of All Souls Hospital, Morristown, N. J. whose history I cannot give entirely, as requests for it have been ignored. Briefly as I remember it, it is as follows. Dr. C. Ill, while operating on another patient at the above hospital, while I assisted him, was invited to go through the ward; while he was at one end of the ward and I at the other, the history was detailed to us by two members of the staff and from our previous experience we both made the probable diagnosis and Dr. Ill was thereupon invited to operate on the patient, which he did a few days later. The patient following a full-term labor several months before had never ceased bleeding in spite of curettages at various times. Total hystero-salpingo-oophorectomy was performed. Description of tumor: Uterus slightly enlarged, 8 cm. × 6 cm. at the fundus, 10 cm. in length. In left cornu and fundus the characteristic placenta-like mass, 3 cm. × 6 cm. Adnexa normal. Microscopically typical choriocarcinoma. I am much indebted to Dr. C. Ill for permission to operate on the first two cases and to report here all three of them.



High-power microphotograph of Case III. Choriocarcinoma.

To unify these various points into a system of symptomatology upon which to base diagnosis, judging by the great diversity of phase which all the foregoing has only hinted at, is rather a large undertaking. Still with modifications both ways, salient features predominate and we must keep them in mind when the case presents itself. Of course the last resort is the microscope, the findings with which determine absolutely the existence or non-existence of a malignant neoplasm. To that we shall recur, in a minute. But the clinical points on which the diagnosis of this neoplasm rests are also fairly distinctive. First, the neoplastic growth occurs only in a woman who has been pregnant; how recent the pregnancy or how long before is rather a difficult question to answer, for many cases are reported in which a varying number of years have elapsed between the pregnancy and the tumor. However, the danger is proportionately greater the more recent the pregnancy, its termination in an abortion with retained placenta; and greatest after a hydatid degeneration of the placenta. Second, after such interruption or degenerative change of pregnancy, the occurrence of persistent hemorrhage, based on which curettages are so performed, but apparently in vain, for there is really never a total subsidence of the bloody discharge; where the uterus is flabby and enlarged and the cervix is patulous, giving the feel of subinvolution, there is cause for apprehension in the direction of the difficulty under consideration. Third, the anemia and the cachexia are nearly always distinctive and, as several of the writers have pointed out, the anemic facies is not only that of the severe hemorrhagic depletion of a neglected abortion, but is rather the cachectic look of those dying of malignant disease. Fourth, either consequent upon or concurrent with such a pregnancy, metastitic growths in the lungs, vagina, brain, kidneys or liver may be the only symptomatic evidence of something wrong; so that a cough with bloody mucus, or characteristic nodules in the vagina are distinctive enough to make a positive diagnosis possible. In the vagina, the nodules are characteristic in color (purplish red) rather friable, and when ulcerating giving off a sanious, ichorous fluid, with necrotic odor; they have a typical malignant "look."

In answering the question as to incidence, we need only point to the corollary of pregnancy as an essential and the age corresponds to the child-bearing period. Stone says (AMER. JOUR. OF OBST., Oct., 1907) that the youngest case reported was, in a girl of seventeen, by Ahlfeldt (*Monatsch. f. Geb. u. Gyn.*, 1897, i.); Champneys reports it in one of eighteen (*London Practitioner*, 1896). The oldest case reported was in a woman of fifty-two, by Hollemann (quoted by Marchand, (*Zeitsch. f. Geb. u. Gyn.*, 1898, i).

Ladinski reported that the elapse of time between the termination of preganncy and death as it occurred after mole, labor at term or abortion were from three days to six years in mole, and two weeks to one and one-half years in abortion cases, and from one to nine months after labor at term. The average was from four to six months.

Treatment.—The only treatment that need be discussed is operative. When there is evidence of hydatid mole, the uterus should be emptied immediately and the most painstaking microscopic examination of the tissue made. If there is any evidence of malignant proliferation, one must agree with Neumann that it is really true conservatism to extirpate uterus and adnexa *in toto.* The same holds true if after an abortion or even after normal labor there be inexplicable bleedings. It is interesting in this connection to see that Deaver in his recent paper at Atlantic City, reported finding in a hysterotomy a small chorioepitheliomatous area and promptly extirpated the uterus and tumor.

THE SURGICAL TREATMENT OF POSTERIOR UTERINE DISPLACEMENTS WITH REVIEW OF VARIOUS METHODS PAST AND PRESENT.*

BY

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(With fifteen illustrations.)

WHEN one's attention is called to the fact that another paper has been written on the subject of posterior uterine displacements, with a sigh the spontaneous query is, "Alas! Is the end not yet?"

A study of eighty methods devised to correct a retroverted uterus, impresses one, not with the skill and comprehensive minds of the operators, but with the ingenuity displayed in playing with a sort of anatomical puzzle, the object of which is to determine the greatest number of means by which the same end may be attained and allow the patient a continued existence.

In 1913 there were 131 papers written on the subject of posterior displacements of the uterus, forty-three in this country and eighty-

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* Read before the Twenty-seventh Annual Meeting of the American Association of Obstetricians and Gynecologists at Buffalo, September 15–17, 1914.

eight abroad. From January, 1914, to August 1, 1914, seventy-two papers were written on this subject, twenty-two in this country and fifty in other countries.

Many of these papers are but reiterations of what has been previously written, others give most conflicting views as to the effect of certain operations on subsequent pregnancies, while a still smaller number describe a new operation or a modification of an old one.

Credit for pioneer work in this branch of surgery belongs to Alquiè who published his efforts in 1840. Koeberle followed in 1869. Adams in 1880 and Alexander in 1881 were experimenting with the extraperitoneal shortening of the round ligaments. In 1884 Alexander's published work gave this operation world-wide recognition. Within the next five years there were fifteen modifications. During the following fifteen years up to April, 1913, nine modifications have been deemed worthy of publication. With a few exceptions consisting of refinements of technic, all the changes merely complicated the original operation and added nothing to its worth. Edebohls split the entire length of the inguinal canal, drew the ligaments out at the internal ring and closed the wound as in the Bassini operation. Goldspohn's method was similar. Newman made an incision directly over the internal ring, drew the ligament straight out and secured it in the wound. Then as the simpler means of anchoring the ligament had been disposed of, Martin passed a dressing forceps beneath the skin and subcutaneous tissue from one wound to the other, drew the ligaments through and tied them together. Doleris employed the same method but sutured the ligaments instead of tying them.

Cassati joined the lateral wounds with a curved incision in which the crossed ligaments were sutured. After the possibilities of fixation of the ligaments by the utilization of the tissues in the immediate vicinity of the inguinal canal were apparently exhausted, along came the most recent contributions of Spaceti, Marguis and Figueroa, the latter in April, 1913, who made use of muscle and fascia for fixation of the ligament at a distant point from the internal ring.

Most of the operations in which the round ligaments are shortened intraabdominally have been devised or modified by operators in this country. As in the case of the extraperitoneal operations, the early operations were simple. Then came the modifications, and as the simple procedures were used up, the later operations were turned out with increasing complexity. Of the thirty-two methods described as giving more or less satisfaction to the various inventors, but twenty-three will here be given consideration.

Wertheim, Bode and Wylie made simple folds in the round ligaments. Bardeccu brought the round ligaments together and sutured them to each other. Mann folded the ligaments in triplicate. Bissell cut out a section of the round ligaments and sutured the ends together. Ries put a hole in the anterior uterine wall, brought the round ligament through it and secured it to the anterior uterine surface. Dudley approximated scarified surfaces on the broad ligament, high up between the round ligaments and the uterus, with corresponding scarified areas on the anterior surface of the uterus.

At this juncture there is a lull in the intraabdominal round ligament manipulations, and they are attacked by Schnecking, Klatz, Goffe, Vineberg and others through the vaginal route. This approach never became popular and we soon find the intraabdominal work continuing. Simpson drew the round ligament under the peritoneum of the broad ligament and vesicouterine pouch, to the abdominal wall where it was secured. Willis advanced the round ligaments to a point in the midline of the anterior surface, a half inch from the apex of the uterus, then plicated the broad ligament to within a half inch of the bladder. Coffey seizes the round ligament one and a half inches from the uterus, stitches it to the anterolateral border of the uterus at the beginning of the vesicouterine fold. The broad ligament is then seized an inch and a half externally, wrapped over the round ligament and stitched to the uterus down to the vesicouterine fold. The round ligament suspension of Gilliam at once commanded attention as being a distinct advance in the operative measures for the relief of a retrodisplaced uterus. Barrett complicated Gilliam's comparatively simple technic by bringing the round ligament out through the aponeurosis and back again into the peritoneal cavity through a second opening. Hall made use of the Gilliam idea when he brought the round ligament through the internal abdominal ring over the rectus muscle and secured it under the aponeurosis.

The Baldy-Webster operation immediately impressed one as having greater merit than many of its predecessors. The round ligaments are grasped through an opening made posteriorly in the broad ligaments, pulled through and sutured to the posterior surface of the uterus. The modifications of this method have consisted in little refinements of technic, such as Soresi's hair-pin and Pollak's extra stitches.

Strobeel, in 1912, described a round ligament suspension, which requires two small vertical incisions on either side of the pubes, in addition to a median incision. The superficial tissues are incised in the lateral wounds down to the fascia, forceps pushed through the fascia and underlying structures into the peritoneal cavity, the round ligaments pulled into the pubic wounds and secured. 1913 yields Buteau's suggestion of anchoring a stout suture firmly into the tissues just above the internal ring. The peritoneum of the distal end of the round ligament is then pierced and the suture run below the serous coat close to the round ligament up to a quarter of an inch from its uterine attachment. The broad ligament is then pierced beneath the ovarian ligament, the needle made to enter the posterior wall of the uterine serous coat, passing downward and inward to the median line, this procedure is repeated on the opposite side. The two free ends are tied behind the uterus with sufficient tension to produce the desired degree of anteflexion.

In the evolutionary development of the operations attaching the uterus to the anterior abdominal wall, credit must be given to Olshausen for giving this plan a lasting stimulus. We may trace the operation through the stage which fastened the uterus in the wound as a sort of plug, to a later method in which the uterine fundus was stitched to the anterior abdominal wall. When this method had shown itself to be objectionable Kelly bent the uterus over in partial anteversion and fixed the posterior surface of the fundus to the anterior abdominal wall. This change was an improvement but in immobilizing a normally movable organ there were objectionable sequellæ. Then Kelly developed the ventrosuspension which depended for its success on the production of an artificial ligament existing between the anterior abdominal wall and a point just posterior to the uterine fundus. This operation from its very nature, precluded the long list of modifications and stood practically unassailed for several years.

To avoid the buried suture, Martin suggested using the urachus or, when it was not well defined, a loop of peritoneum carried from below upward through a button-hole slit in the fundus. Foster, in 1911, published a ventrosuspension in which peritoneal strips were made to pass through the anterosuperior surface of the uterus and were anchored in the opposite abdominal wall. This operation is much more complicated and causes considerably more tissue trauma. Wereth attached the anterior surface of the uterus to the peritoneum of the anterior pelvic wall. Kaltenbach passed sutures into the fundus through unopened peritoneum.

Methods confining themselves to operative procedures on the uterosacral ligaments alone, have been comparatively few in number. The chief advocates have been Freund and Gottschalk who shorten the ligaments through a vaginal incision and Young who makes his attack through the abdomen. A large number of miscellaneous operations designed to correct posterior displacements, interest us to-day from an historical viewpoint alone.

In 1876 Lenweck opened the description of his operation with the statement that, inasmuch as the operation was not painful, anesthesia was unnecessary. His interesting technic consisted of first splitting the entire length of each side of the cervix with scissors. A knife made of flexible metal was curved to fit the uterine cavity, introduced to the fundus, and the anteriolateral wall of the uterus slit open. The opposite side was treated in a similar manner. The parts bathed with ice water until bleeding began to diminish, then the open wounds were cauterized with carbolic acid and the patient put to bed. After forty-eight hours a dilator was introduced to the fundus, all parts well expanded, and carbolic acid again applied. This treatment was repeated every three days until the twelfth day, then once a week for six weeks.

It is with scarcely less amusement that we read of the operations of Czerny and Leopold who passed long threaded needles from within the fundus of the uterus through all structures of the abdominal wall. The needles were unthreaded, withdrawn, and the threads tied over the skin. Schuking fastened the fundus of the uterus to the anterior vaginal vault. Sauyer endeavored to hold a uterus forward by passing a deep suture around Douglas' fold through the posterior vaginal vault. Stratz obliterated the cul-de-sac by a colporrhaphy. Duhessen opened the vaginal vault transversely, pushed the bladder back and sutured the corpus uteri to the vagina. Mackenrodt separated the vagina from the bladder through a longitudinal incision and fixed the uterus to the anterior vaginal wall. Gebhard exposed the uterus through a vaginal incision encircling the round ligaments with a long suture which was passed through the abdominal wall and tied over gauze pads.

In this brief review of the chief operations that have gained more or less recognition, one is impressed with the persistent struggle through years to devise a satisfactory operation for a retroverted uterus. The profession is slow to grasp the fact that the ideal operation will never be invented. Methods have been worked out which have proven most satisfactory in properly selected cases, yet when applied to others, the results have been dismal failures. The best results are quite likely to be obtained by one who is not an inventor, for the reason that it is difficult for such an one to approach this pathological condition with an open mind. William Alexander once made the remark before the British Obstetrical Society that he had never tried a ventrosuspension because he felt so much more at home with his own operation. Unfortunately this expresses the attitude of many operators. The extraperitoneal shortening of the round ligaments is an operation which should be condemned, in the first place it is based on a faulty principle.

In Fig. 1, Modified from Gray's Anatomy, is shown the relationship between the point of exit of the round ligament at the internal ring and its point of attachment to the uterus. Were the round ligaments swinging free in the pelvis, traction on the distal part of the ligament would draw the uterus upward as well as forward, but such is not the case. The round ligaments are covered by peritoneum which is attached to the ligament and neighboring structures by loose connective tissue. Its attachment to the pelvic viscera mesially, and its blend with the parietal peritoneum laterally limit its mobility.

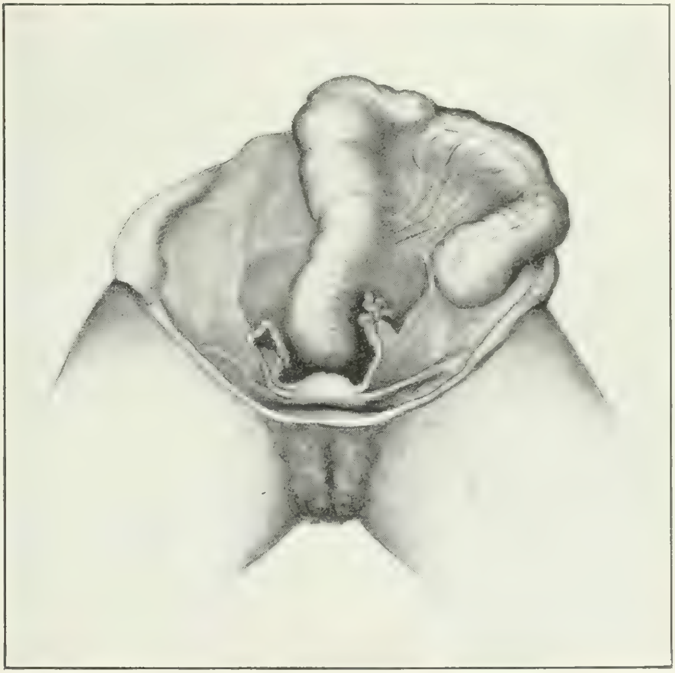

FIG. 1.

Therefore this peritoneum, as shown in Fig. 2 acts as sort of an elastic tunnel through which the round ligament may be drawn for a short distance. Inasmuch as there is a continuous downward pull of this tunnel and its midportion is at a lower level than the uterine fundus, the traction on the round ligament through the internal abdominal ring must pull the uterus forward and downward and thus increase the prolapsus. The stretch of the peritoneal and connective tissue fibers is depicted in Fig. 2(*b*).

In addition to this mechanical fault, the operation is not without danger even though one eliminate all cases that might fall under the timeworn list of contraindications.

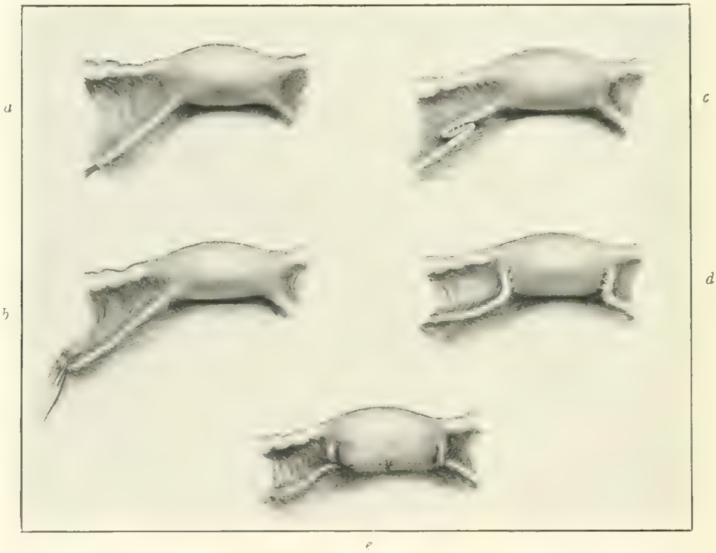

FIG. 2.

At the meeting of the American Gynecological Society in 1913, a prominent gynecologist said, "I should feel ashamed of the man who could not make a diagnosis of uncomplicated retroversion of the uterus." I have two cases to present, either one of which would give this surgeon cause for shame.

The first case, Mrs. N. A., age twenty-six, was operated on at St. Elizabeth's Hospital, N. Y., December, 1910. She had had an Alexander operation performed during the previous year to favor her chances of pregnancy. Almost immediately after this operation she began to have what was termed intestinal indigestion, manifesting itself by frequent attacks of severe pain in the lower abdomen, obstinate constipation, gastric disturbances and points of tenderness over the appendix and just above the symphysis. Thinking the appendix at fault the abdomen was opened and a strong band of adhesions found between the uterus and a loop of ileum as shown in Fig. 3. In addition the appendix was inflamed and adherent to the ileum. The adhesions between the uterine fundus and the ileum were not and could not have been diagnosed before the operation.

The appendix was removed and the adhesions between the uterus and the ileum separated, at once relieving the constriction of the gut. It is of interest to note that while this patient was greatly relieved, her general condition did not improve satisfactorily, her appearance being that of intestinal toxemia. Two years later, after listening to a talk by Sir Arbuthnot Lane, this patient was sent to Dr. L. G. Cole of New York for an *x*-ray examination. The diagnosis of a Lane kink was corroborated at the second laparatomy, the fixation bands freed and the patient is well to-day.

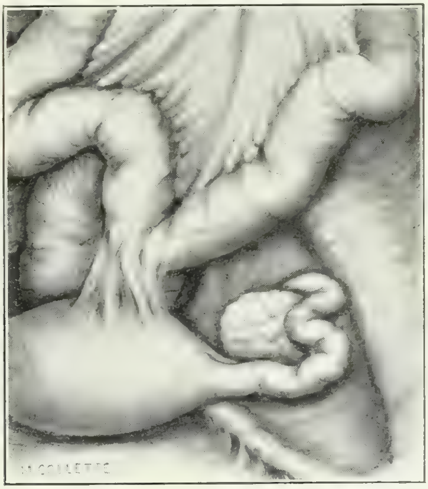

FIG. 3.

The second case is an equally potent argument against this type of operation. Mrs. L. P., age twenty-eight, operated on at the New York Red Cross Hospital, in July 1913, had been suffering from intestinal stasis for several years, a retroverted uterus pressing on the rectum was said to have been the cause of her trouble and an Alexander operation had been performed. At once she developed severe and constant pain in the left lower abdomen and her difficulty in emptying the bowel became much worse. After an *x*-ray examination of her gastrointestinal tract by Dr. A. J. Quimby of New York, a laparatomy was performed. Several bands contributing to the intestinal stasis were found but the point of interest in connection with the subject under consideration is shown in Fig. 4.

An ovarian cyst is seen to have attached itself to a loop of pelvic colon, while the uterus was displaced posteriorly there was no drag on the bowel, but when the uterus was drawn forward, an acute kink was made in the involved intestine.

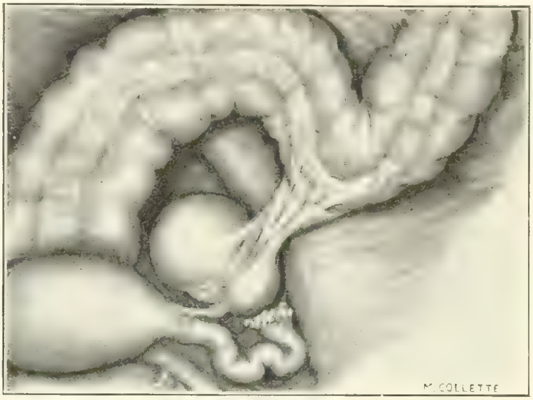

Fig. 4.

In July, 1914, Mrs. A. P. was operated on at the N. Y. Red Cross Hospital for a retroverted uterus and colonic stasis. A stout fibrous band was found as seen in Fig. 5 extending from the base of the bladder, over the round ligament and attached to a loop of pelvic colon. Had the round ligament been shortened through the internal abdominal ring and thus elevated, the bladder and the colon would have been dragged toward one another thus causing much distress.

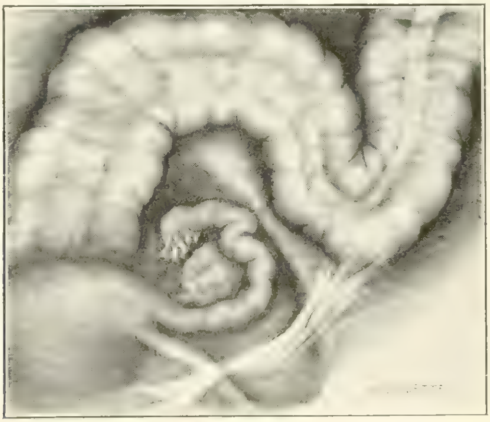

Fig. 5.

After observing a few such cases as these, and after giving a little thought to the structure of the pelvic tissues, it is difficult to reconcile one's views with the statement of Van Teutem who, in a report this current year (*Zentralbl. f. Gynek.*, 1914, III, No. I) states that in a study of 1364 patients at the Leyden clinic, the Alexander-Adams operation had given the best results.

With modern technic, the objection that one cut through the abdominal wall is more dangerous than two cuts half way through the wall, is not worthy of serious consideration. The intraabdominal shortening of the round ligaments has obvious advantages over the extraperitoneal method. All operations which merely reef the round ligaments, however, have the same fault mechanically as those of the Alexander type. Fig. 2 (*c*) will illustrate this general class, the objection being that the midportion of the round ligament is at a lower level than the internal ring and the uterine fundus, which form the two points of counter-tug, therefore, the uterus must be pulled forward and downward.

The Coffey type and the Baldy-Webster operation are not open to this objection since by transplanting the midportion of the round ligament, the uterine attachment is at a lower level than the internal ring thus drawing the uterus forward and upward, or at least tending to prevent further downward displacement, as may be seen in Fig. 2, *d* and *e*, page 464.

The Coffey operation has disadvantages which may offset its merits. Aside from considering the possible circulatory constriction in wrapping the broad ligament over the round ligament after it has been attached to the uterus, there exists the very real danger of constricting or kinking the tubes. That this objection is not fanciful is demonstrated by the case of Mrs. J. B. T., operated on in Texas for retroverted uterus. The type of operation was not known until a second laparatomy showed that a Coffey operation had been performed. Either the broad ligament had not been sufficiently lax or the stitches had been taken too high and too far from the uterine margin, causing a downward and inward drag on the tubes. The resulting circulatory disturbance is no doubt responsible for the production of the double hydrosalpinx shown in Fig. 6.

The method which I have been using most frequently for more than five years makes use of the Gilliam idea, with slight modifications which tend to simplify rather than complicate the technic. The operation may be performed equally well through the median vertical, or transverse incision following the curve of the suprapubic skin fold. When the median vertical incision is used, the aponeurosis is separated from the underlying muscle by pressure with a gauze pad to a distance of one inch each side of the median line. The right rectus muscle is then displaced to the outer side and the abdominal cavity opened three quarters of an inch to the right of the median line. After an inspection of the viscera, not overlooking the drainage system, the indicated repair work is attended to before considering the uterine displacement.

The patient is placed in Trendelenburg position to favor the gravitation of intestine out of the pelvis and permit an unobstructed view of the pelvic contents. No pads are used unless necessary, when employed they are moistened, gently spread over the presenting intestine and any necessary pressure made after the pad is in position. Every peritoneal rub invites adhesion formation, the minimum amount of peritoneal manipulation therefore is of obvious advantage.

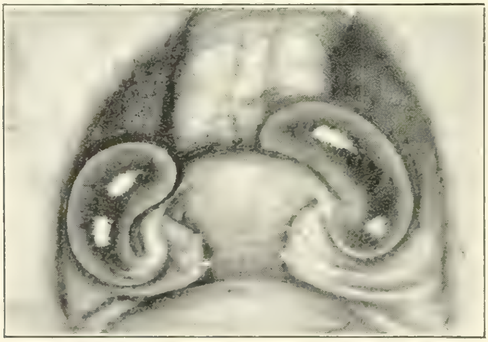

Fig. 6.

It is quite improper to state that the round ligament should be grasped one or two inches from the uterus, the point at which the ligament should be picked up must be determined not only in each individual case but on each individual round ligament. The point selected on each ligament should be such as will bring the uterus upward and forward when the ligaments are lifted into position, allowing the fundus to swing at least a half inch below the peritoneal level of the anterior abdominal wall.

The selected point must depend upon the length and laxity of the round ligaments. Having determined the proper site a needle threaded with parafined linen or silk is passed underneath the round ligament including as little of the broad ligament as possible. The lubricated thread slides through the tissue with the least amount of trauma and has no tendency to twist the ligament on its long axis while pulling it through, thus constricting its blood supply. The aponeurosis is then retracted on each side of the median line exposing the muscle. At a point three quarters of an inch from the edge of the abdominal incision and about an inch and a half above the symphysis pubes, a pointed forceps is pushed between the muscle fibers downward and outward into the abdominal cavity. The thread surrounding the round ligament is grasped and the knuckle of ligament drawn through the peritoneum and muscle after the manner of the Gilliam technic. Instead, however, of bringing the ligament through the aponeurosis it is secured to the under surface of this fascia with three stitches of linen thread as shown in the illustration (Fig. 7) each including but one half of the ligament to avoid strangulation.

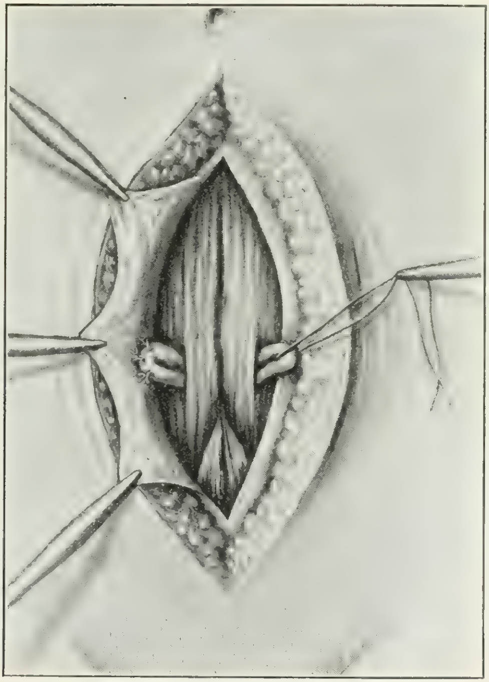

Fig. 7.

The advantages of stitching the round ligament to the under surface of the aponeurosis, rather than bringing it through and securing it anteriorly are fourfold: Infection is most likely to occur in an otherwise clean case, in the superficial tissues. The aponeurosis is an efficient barrier to the downward spread of infection, when the round ligaments present through an opening in this structure a direct means of conduction of the infection into the pelvis exists. Again, the muscle tissue has insufficient power to strangulate the round ligaments passing between its fibers. Such is not the case, however, with the strong fibrous structure of the aponeurosis. As all scar tissue tends to contract, the constriction around the ligament may cause a progressive strangulation resulting in a complete atrophy of the structure. In fact, I was first led to alter my technic by the case of an associate which required an abdominal section a few months after a typical Gilliam operation had been performed, in which just such an atrophy had occurred. The stitches were intact but the knuckle of round ligament had literally been bitten off by the aponeurosis. The operator was positive that the stitches had been properly inserted and had not caused strangulation.

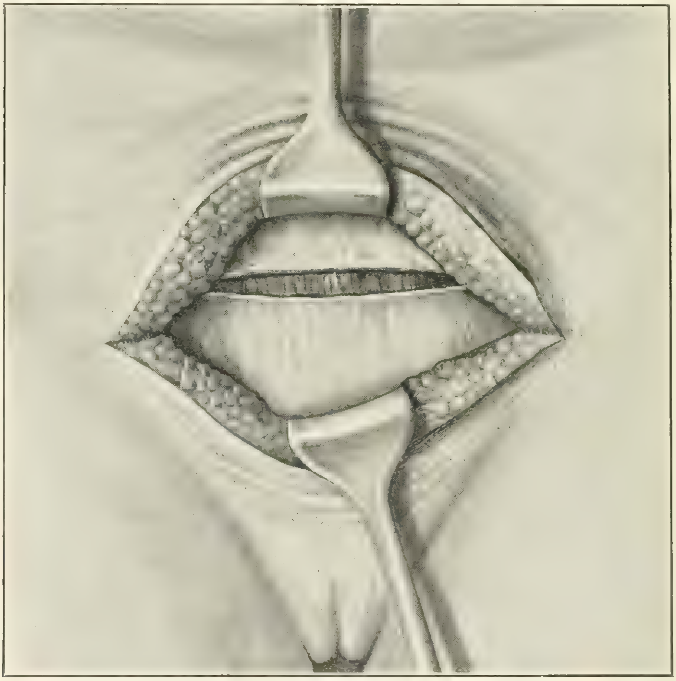

Fig. 8.

The chief advantage, however, of this technic is in the fact that one-half to one inch less ligament is needed above the peritoneal level of the anterior abdominal wall than is required for the Gilliam operation, thus making the method applicable to a greater number of cases. The fourth advantage of not bringing the round ligament through the aponeurosis obviates an objection that has been raised to the Gilliam operation, namely that the opening in the aponeurosis invites hernia. I have been able to trace no authentic cases in which this has occurred and think this objection perhaps fanciful. The operation is completed by wound closure in the usual manner, uniting separately five layers of tissue. The curved transverse incision may be used equally well with the vertical in this operation and has some advantages. By making the incision in the natural curve of the suprapubic skin fold, closure of the wound may be obtained with an almost invisible scar which has but little tendency to stretch. When the patient cannot see the scar she is not reminded of her "terrible operation" every time she takes a bath. The technic of performing this operation through the transverse incision is shown by the accompanying illustrations.

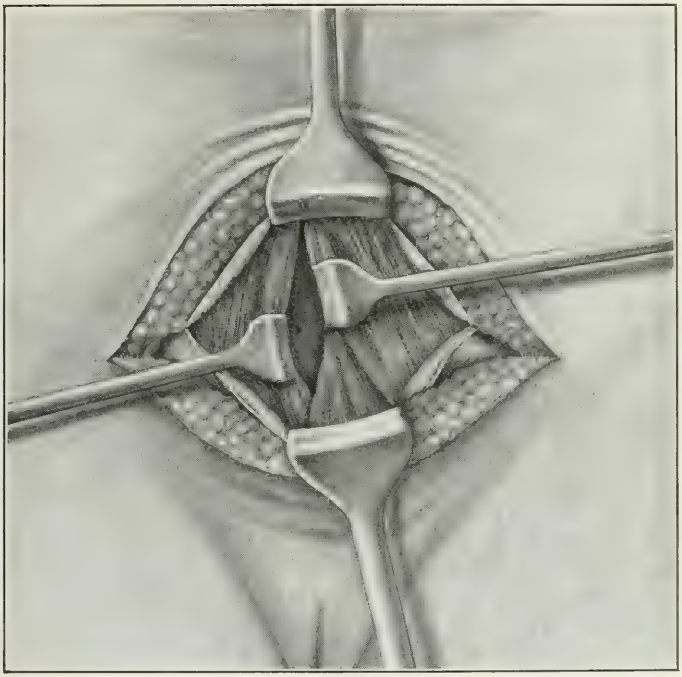

FIG. 9.

In Fig. 8 the division of the skin and subcutaneous tissues is seen following the curve of the suprapubic fold. The aponeurosis is then incised at a level three quarters of an inch higher.

In Fig. 9 the aponeurosis is retracted showing the separation of the right rectus muscle from the left above and from the right pyramidalis below. The pyramidalis overlaps the lower portion of the rectus from which it may be readily separated without destroying any muscle fibers by incising its marginal fascia. The peritoneum is next incised vertically a little to the right of the median line so that the line of incision will be overlapped by the rectus when this muscle is brought back into position. The round ligaments are picked up and brought through the muscle as previously described, and then attached to the under surface of the lower flap of aponeurosis as shown in Fig. 10.

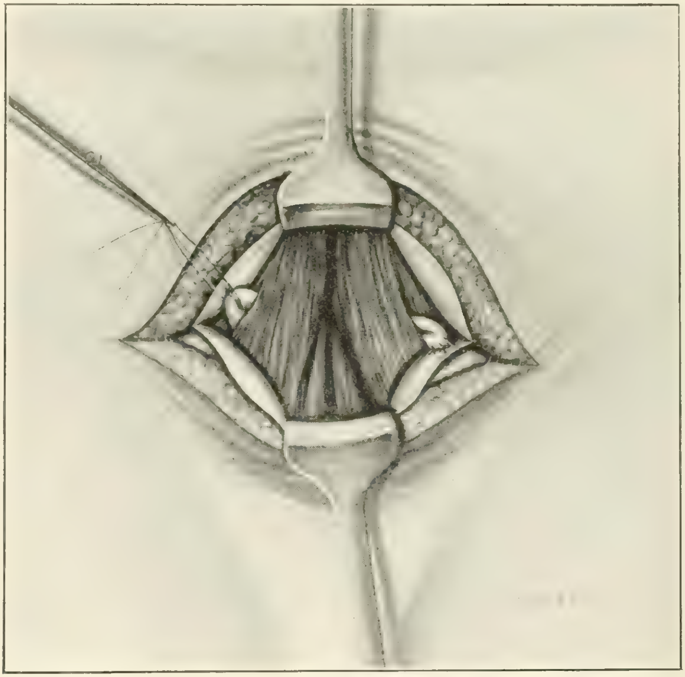

FIG. 10.

In following this technic it will be seen that no two important tissues have been incised in the same line thus insuring a strong closure. As there is practically no strain on the skin margins of this incision, the subcuticular stitch of fine catgut is the most satisfactory method of skin closure. A very common error in technic in the round ligament suspension operation is the inclusion of a considerable portion of the broad ligament in the traction loop passed under the ligament.

In Fig. 11 the proper method is shown on the right and the faulty technic on the left. The kinking of the tube from broad ligament inclusion after the round ligaments have been drawn through the aponeurosis is unquestionably responsible for much of the pain that has aroused criticism of the Gilliam operation.

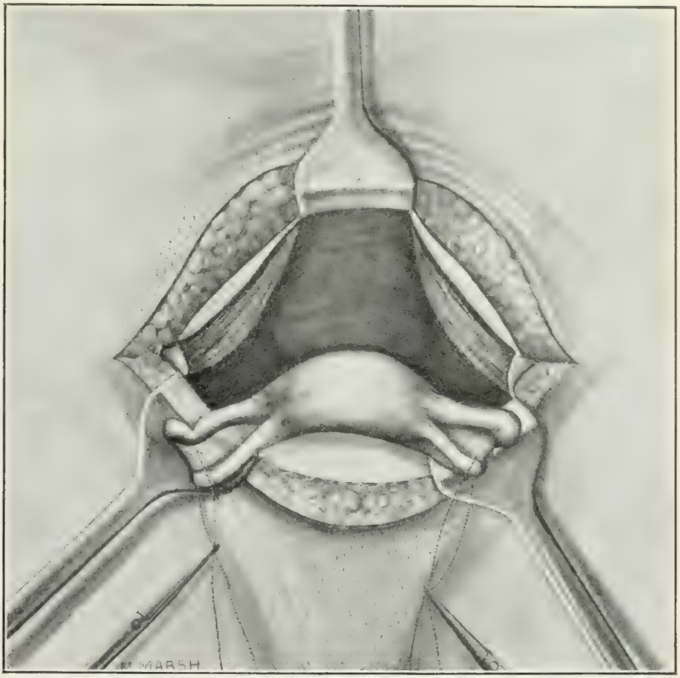

FIG. 11.

In Fig. 12 is shown a marked angulation of the left tube when a considerable portion of the broad ligament was caught up with the round ligament in bringing the knuckle of ligament through the aponeurosis.

On the right is shown another common error of technic. The loop of round ligament has been brought through the aponeurosis too far from the mid-line and too far above the symphysis, making the uterine traction upward, backward and outward instead of upward and forward. These conditions were produced on the cadaver for purposes of illustration.

The ventro-suspension operation has a field of usefulness when it is not possible to obtain desired results by utilizing the natural uterine supports. The disadvantages of the method are too well known for further comment. The writer has had but three opportunities to inspect abdomens after this operation had been performed.

The first case came to Vanderbilt Clinic in 1911, complaining of severe pelvic discomfort. She had been operated upon the previous year for "womb trouble"; after several months of relief, her symptoms recurred. On operation the condition seen in Fig. 13 was observed. A firm band had been formed but so stretched as to permit the fundus to drop back into the cul-de-sac. It will be observed that the attachment of this ligament to the uterus was improperly done, being placed anteriorly so that the intraabdominal pressure was exerted on the anterior surface instead of the posterior.

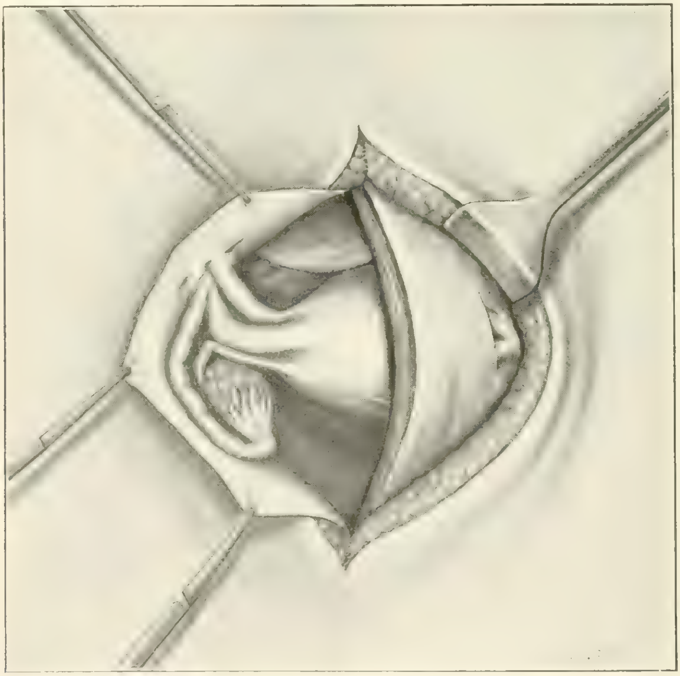

Fig. 12.

The second case, Mrs. E. P., was operated upon at the New York

Polyclinic Hospital in June, 1914. A year previous she had been operated upon in Berlin for "falling of the womb." After the operation she had a sudden development of distressing bowel trouble for the relief of which she willingly submitted to a second operation. The uterus was firmly attached to the abdominal wall by a strong fibrous band one and one-half inches long. While the uterus in this case was held up out of the pelvis one pathological condition had been replaced by a still more troublesome one.

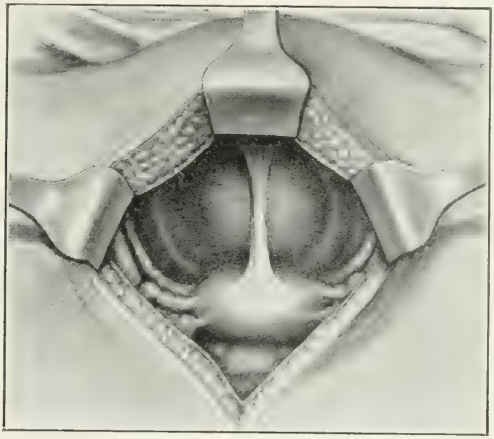

Fig. 13.

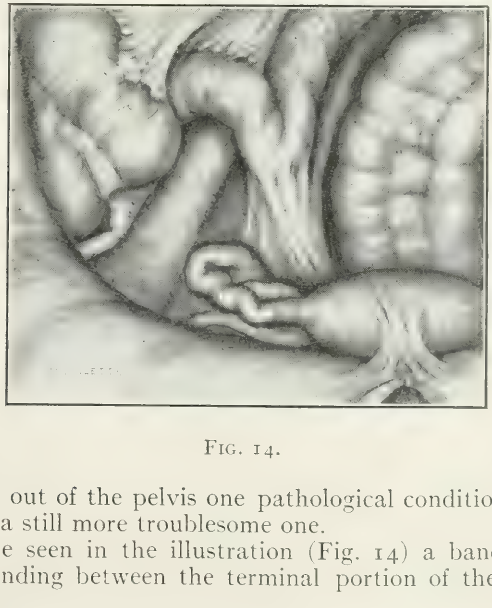

Fig. 14.

As may be seen in the illustration (Fig. 14) a band had been formed extending between the terminal portion of the ileum and the broad ligament just below the uterine end of the right ovarian ligament, with the resulting kinking of the gut when the uterus had been drawn forward.

The third case was a most interesting one, operated upon by Dr. W. S. Bainbridge of New York, in which a loop of ileum had become strangulated between two bands of the artificial ligament resulting from a Kelly ventro-suspension operation performed two years previously.

Fig. 15 emphasizes the fact that even well-developed round ligaments under continued strain may become sufficiently lengthened to permit a recurrence of a posterior displacement. Miss E. B., aged twenty-four, was operated upon in the New York Polyclinic Hospital during July, 1912, for a retroverted uterus, the modified Gilliam technic being employed. She left the hospital on the twentieth day with an apparently good result. Two days after reaching her home she developed tonsillitis, this infection was followed by a nervous collapse. The young lady showing no disposition to get out of bed, was allowed to remain on her back for six months. Eight months later the fundus uteri was found in the posterior culdesac. At a second operation the uterus was once more put into position by essentially the same method. The patient was this time given proper after-care and her condition to-day is most satisfactory.

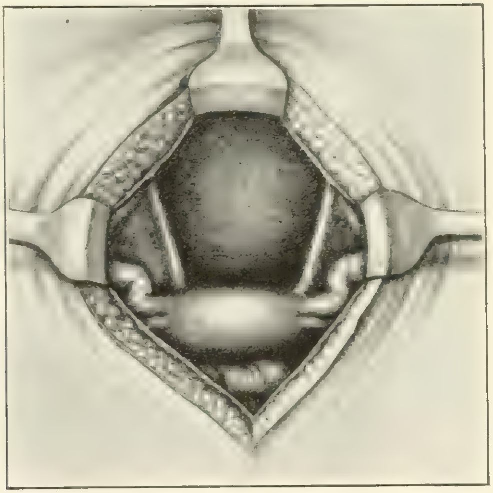

FIG. 15.

The shortening of the uterosacral ligaments is occasionally of advantage as a supplementary procedure to other operative work, but is unsound as a complete operation in itself. A round ligament suspension should not be tried if the ligaments are very attenuated, or if they are not sufficiently lax to permit the uterus to swing clear of the peritoneal level of the anterior abdominal wall. Should the uterosacral ligaments have become shortened or thickened, as is very apt to be the case in displacements of long standing, should a thickening of the vesico-uterine fold or any fixation of the broad ligament interfere with the elevation of the uterus, no suspension method should be used, but the uterus swung in the Baldy-Webster cradle. No operation is apt to produce pleasing results when a sound pelvic floor does not exist.

Success in the operative field of posterior uterine displacements can only be achieved by the operator who takes a comprehensive view of the existing pelvic conditions, who is familiar with fundamental anatomic facts, who is not a slave to a method and who possesses the technical skill to adapt his procedure to his case.

220 West Seventy-ninth Street.

SOME CONSIDERATIONS ON THE NEEDS AND USES OF ABDOMINAL CESAREAN SECTION.*

BY

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(With two illustrations.)

A conscientious reflection on an obstetrical experience that has been somewhat extended and intensely practical, comprising the personal care of several thousand cases during the past twenty-five years, has given me a wholesome fear of the dangers of difficult pelvic deliveries and of the pitiful results that attend them.

Our memories are replete with pictures of those cases to which we have been called to do a more or less destructive operation on both mother and child. We have finished these cases, possibly with the loss of the child, certainly with the permanent injury or the death of the mother. We have spent hours of time, and great labor, in cleaning and sewing, in an attempt to restore the bruised, torn, and infected parts to something of their original condition and natural function. By far the greater part of our gynecological work comes as the direct result of pelvic deliveries in unsuitable cases.

We have only to look about us at the invalid women and defective children to be made to feel that, if the pelvic route was, at first, the ideal highway into this world, then some very serious error has been made in the maintenance of that highway.

There are, of course, many cases where the pelvis is so distorted

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* Read before the Twenty-seventh Annual Meeting of the American Association of Obstetricians and Gynecologists at Buffalo, Setember 15–17, 1914.

and blocked that its traverse is impossible, and a new way must be found. These cases I will not discuss, at this time, for in consideration of them there is no opportunity for debate. I do want, however, to speak of those other cases which, because they are less apparent, are so often "messed up" because of insufficient study beforehand.

I think we must all admit that, in the large number of cases, labor is more difficult to-day than it was a generation ago; that disease and the artificialities of civilization are increasing deformities and defects of structure and forces of delivery; that, in short, we are confronted with conditions which, with increasing frequency, demand the abandonment of the old highway of birth. Are we doing all that lies in our power to make the substitute better than the original in its defective condition? Are we putting enough study into the individual case to be able to choose, intelligently, whether to travel the old or the new way? The necessity is upon us so to train our abilities of diagnosis that we may measure the elements of each case and estimate the difficulties we are to meet. The "test of labor" is the makeshift of incompetence, and must be eliminated by careful training in diagnosis. This, then, I hold to be the first great need of obstetrics, and especially of the successful use of abdominal delivery, the detailed preliminary estimation of each individual case by one trained in this form of diagnosis.

Now, after examination, what? The tendency for several years has been to broaden the scope of the Cesarean operation, and to place under its beneficence many cases which, a few years ago, were considered only for pelvic delivery. This is, I believe, because we are getting constantly better results in our Cesarean operations. These improved results are due not only to improved technic, but also to the fact that our increasing confidence leads us to earlier and bolder action in these "border line" cases. Therefore, I would say that the "courage of our convictions," and the early adoption of this procedure in doubtful cases is the second great need of the delivery by the abdominal route, since we cannot expect to obtain good results where a poor one has been assured by delay and improper handling.

In considering the further need of the operation for suprapubic delivery, I would emphasize the importance of the careful training of the operator and the constant improvement or development of his technic, both in the preparation of his patient and in the detail of the operation.

Is it to be wondered at that, a few years ago, the results were not all that we had a right to expect, when we waited for the patient to begin labor and were thus compelled to do the operation at an inconvenient time and in a hurried manner without proper preparation of the patient.

But what about the operator? Of course the operation should be done only by one who is familiar with, and is trained in, general abdominal surgery. Greater success will be secured, however, if he is also trained in this special operation. This observation holds as true in this as in any other line of work, the one most familiar with the routine will do the better job.

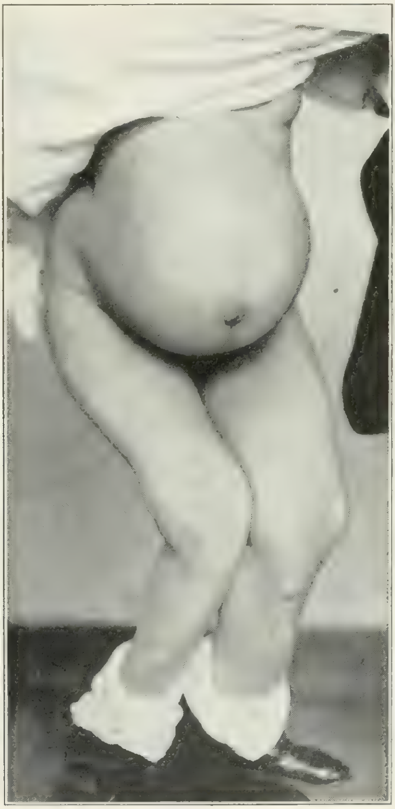

FIG. 1.

The technic, the manner, and the steps of the operation must, of course, be left to the operator at the time. I feel, nevertheless, that there has been too much of the spectacular in this operation in the past; that accuracy and skilful precision have been lost in the waving of banners and the blare of the trumpet. There is nothing about this operation, in the ideal case, to demand the sacrifice of good work for the sake of speed. I find that my patients do better when I take thirty minutes for the operation than they used to when I took from eighteen to twenty. I know that I feel less anxious about my cases now than I did then, since I have the assurance that I have not been careless in my work and that my suture lines are to be depended upon.

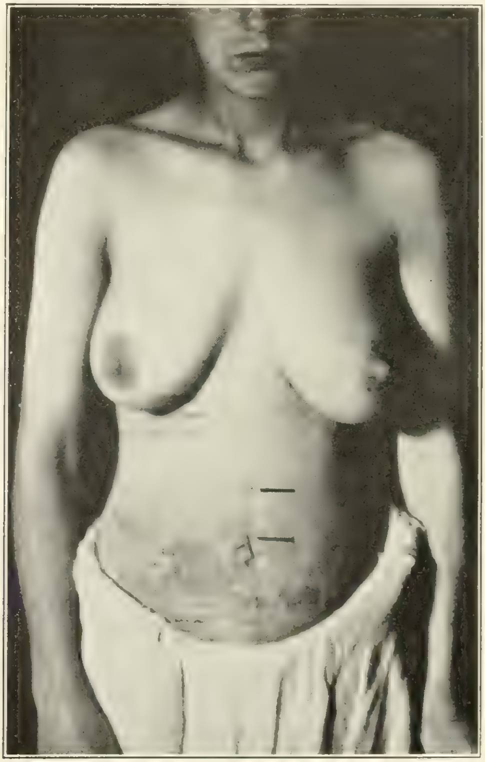

FIG. 2.—Scar seven centimeters long entirely above the umbilicus.

The question of the after-care of these patients is not very different from that involved in any abdominal operation, except that it must be considered also from the obstetrical standpoint, which will be largely a matter of postural drainage.

In brief, my conclusions on the necessities of the Cesarean operation are: First, a more efficient training in the preliminary examina-

No.	Name	Date	Para	Indication	Result		Remarks
					Mother	Child	
1	R. J.	9/26 1907	I	Rachitic dwarf.......	Cure.	Died in fourth week marasmus.	
2	A. C.	10/29 1908	I	Rachitic dwarf.......	Cure.	Good.	
3	C. T.	12/7 1908	II	Previous high forceps, and dead child; ext. conj. 15 1/2 cm.	Cure.	Bifid spine; died in sixth week	
4	A. C.	10/9 1909	II	Same as No. 2.......	Cure.	Good.	
5	E. M.	6/11 1910	I	Congenital idiot; int. conj. 5 cm.; in labor 45 days.	Cure.	Stillborn.	Badly infected; panhysterectomy. *c* drainage.
6	E. F.	9/31 1910	I	Tubercular spine; contracted and tilted pelvis.	Died in fourth week.	Good	Patient was recovered from operation and discharged when taken *c* acute pulmonary consolidation.
7	S. P.	11/28 1910	II	Previous high forceps and dead child; ext. conj. 17 cm.	Cure.	Good.	
8	K. F.	12/12 1910	I	30 hours labor; head floating; int. conj. 8 cm.	Cure.	Good.	
9	M. R.	5/5 1911	Multi	Ankylosis of hips; tubercular.	Cure.	Good.	
10	K. M.	6/18 1911	I	Previous high forceps; skull fractured; head floating.	Cure.	Good.	
11	M.R.	10/8 1911	I	Male pelvis; contracted outlet; 18 hours in labor.	Cure.	Good.	
12	K. D.	12/29 1911	I	Contracted pelvis; int. conj. 8 cm.	Cure.	Good.	
13	E. S.	2/8 1912	II	Placenta previa central.	Cure.	Good.	Pneumonia on third day: Ruptured incision by coughing; expelling large amt. of omentum, this was amputated and wound reclosed.
14	A. G.	7/15 1912	I	Pulmonary tuberculosis and endocarditis.	Cure.	Good.	
15	C. M.	10/24 1912	VIII	Adenocarcinoma of cervix filling vagina.	Cure.	Good.	

No.	Name	Date	Para	Indication	Result		Remarks
					Mother	Child	
16	P. L.	11/5 1912	I	15 hours in labor; head floating; int. conj. 8 cm.	Cure.	Good.	
17	E. G.	1/20 1913	III	Previous high forceps operations: *c* dead children; mod. contraction.	Cure.	Good.	
18	E. B.	1/24 1913	II	Central placenta previa.	Cure.	Good.	
19	M. M.	4/21 1913	I	Ext. conj. 17.5 cm...	Cure.	Good.	
20	M. R.	5/6 1913	Multi	Also Case 9..........	Cure.	Good.	
21	M. S.	5/13 1913	.....	Int. conj. 6.5 cm.; 3 days labor.	Cure.	Good.	
22	R. B.	5/30 1913	V	Central placenta previa.	Cure.	Good.	
23	E. B.	7/17 1913	I	Ext. conj. 18 cm.; head floating.	Cure.	Good.	
24	F. B.	10/1 1913	Multi	Amputated cervix; cicatricial obstruction.	Cure.	Good.	
25	Mrs. Z.	10/24 1913	I	Extreme toxemia, *c* nephritis; edema and retinal degeneration; head floating.	Cure.	Good.	
26	M. S.	1/9 1914	I	Ext. conj. 16 cm.; 2 days labor.	Cure.	Good.	
27	M. R.	3/9 1914	I	20 hours in labor; contracted pelvis.	Cure.	Good.	Futile attempts at forceps delivery by outside physician.
28	K. F.	4/20 1914	II	Also Case 8..........	Cure.	Good.	
29	M. S.	5/20 1914	I	Head floating; int. conj. 7.5 cm.	Cure.	Good.	
30	G. McF.	8/10 1914	I	Deformity from tubercular spine and hip.	Cure.	Good.	
31	O. S.	8/20 1914	I	Contracted pelvis; 2 days labor; head floating.	Death.	Good.	We were deceived as to the handling patient had outside.
32	E. L.	9/7 1914	II	Mod. contracted and tilted pelvis from lateral curve.	Cure.	Good.	Previous labor was high forceps and baby's skull was fractured.

tion of patients, that they may earlier have the benefit of an operation under ideal conditions, *i.e.*, in a hospital, at a specified time, and after adequate preparation. Second, confidence to do these operations under these ideal conditions, rather than submit the patient to a test of labor and a subsequent version or high forceps with a possible or probable destruction of the child and injury or loss of the mother. Third, a trained operator, with a conservative and efficient technic.

Given these conditions, and the mortality from delivery by the abdominal route will be as low as from the simplest laparotomy, and the morbidity will be far less than from pelvic deliveries, while the mortality and morbidity of the children should be nothing.

In submitting the accompanying series of cases, I regret that many of the observations on these patients were mislaid or not recorded at the hospital, so that I am unable to give all of the details that were before us to determine the choice of procedure. I am able to say that each case was given the benefit of careful thought to all elements of the situation.

Up to, and including, Case XI, the operation was done by the long incision, with the turning out of the uterus before opening it. Since then, all cases have been done with the short, high incision.

I enclose pictures of Cases I and XIV, the one showing extreme structural deformity of the whole skeleton, the other how slight is the disfigurement from the scar.

1776 East Ave.

ABDOMINAL SECTION WITHOUT THE USE OF RETRACTORS.*

BY

GEORGE CHANDLER, M. D., F. A. C. S.

In developing a surgical practice in a smaller city, the writer has been obliged to endure many hardships, not so much in the matter of transportation as in the actual paucity of equipment and lack of assistance.

Hysterectomies, appendectomies, gastrotomies, cholecystomies, in fact practically every abdominal operation even for multiple gunshot wounds of the intestines, have been performed with no other assistance except the family doctor and he was the anesthetist. This condition does not obtain now, but the habits engendered during these trying times have remained.

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* Read before the Twenty-seventh Annual Meeting of the American Association of Obstetricians and Gynecologists at Buffalo, September 15–17, 1914.

Obviously, if you operate without an assistant, you cannot use retractors unless of the self-retaining variety. The writer was never very successful in their use, finding them cumbersome, elaborate and, in the majority of cases, hard to adjust; particularly if the patient is restless and strains under the ether, which is the rule with a poor anesthetist.

Operating without retractors has become a uniform practice for this reason, and the more this method is used, the more I am convinced that it is, in the majority of instances, the best method. In support of this idea, let me present the following facts: When retractors are used, the incision must be larger than is really necessary, for it must accommodate not only the hand of the operator, but the hard, unyielding surfaces of the retractors themselves. The amount of time wasted in adjusting them redounds to the disadvantage of the patient. They are rarely held just right and have to be constantly readjusted as the operation proceeds. The operator himself, when retractors are used, gets into the habit of doing his work deep in the cavity, and does not bring the structures well up into the incision; on this account he becomes almost a slave to his eyes, and a surgeon who cannot see more with his hands than his eyes is a slow and tedious worker.

When mechanical work of importance is to be done, the structures are usually mobile and, if properly manipulated, can be brought well up to the surface. It is remarkable how easily with a little practice structures may be brought up and outside the wound. If there have been tremendous inflammatory processes with infiltration, and when the tissues are edematous and will tear easily, nothing but the simplest kind of work should be done. It is then mostly a case of drainage.

If retractors are used, two or three and sometimes even four assistants are necessary. How much greater is the chance of infection when several pairs of hands must be sterilized! This to my mind is of great importance. Particularly is this true when we operate in private homes, and in smaller hospitals in the country, where the dangers from the unclean hands of too many unskilled assistants, is incalculable. This is obviated, if the operator can do his work with one trained assistant and no retractors.

The pressure by retractors against the raw surfaces of the wound is, to my mind, the greatest of all objections to their use. The average laparotomy is from twenty to forty-five minutes in duration. For this length of time there is kept against these raw surfaces a pressure of a good many pounds. There must, in the very nature of things, be a very considerable traumatism to the tissue which is far-reaching in its after-effects to the healed wound. The nerve supply to the abdominal muscles is so bruised by this long-continued pressure, that a certain amount of inflammation will occur, and as a result trophic disturbances will manifest themselves later in weakened muscles culminating in postoperative hernia.

There are instances where a retractor would seem to be almost a vital necessity, but a soft sterile towel, if properly used, will give even better results, especially when the Trendelenburg or the reverse Trendelenburg position is used.

The absence of postoperative hernia for the last nine years in the writer's nondrainage cases, many of them done under the most trying circumstances, caused him to seek some logical explanation of this result. The fact that during these years no retractors have been used in a varied surgical practice, averaging 200 laparotomies a year, seems to have some connection with it; before this time, the writer had his share of hernias and their attendant worries.

It has always seemed to me that too much stress was placed upon the opening and closing of the abdomen. The lesion and the work to be done inside are surely the main points of the operation. Therefore a quick entrance and a simple and rapid closure are of the greatest advantage to the patient. All of the above cases were closed as follows: One continuous long strand of No. 2 plain catgut suffices for the entire closure, whipping together first the peritoneum, making an ectropian where possible, then the muscle, then the fascia, and lastly a subcutaneous suture for the skin. The subcutaneous suture allows a slight serous exudate, especially in fatty abdominal walls to drain. There is very little traumatism in this kind of suture, while the coarser sutures such as chromic gut and interrupted sutures with their knots, act as foreign bodies and become irritants.

Four essential points are necessary for primary union: Cleanliness, apposition, a dry wound and immobility of the tissues. Cleanliness is best obtained under the ordinary aseptic routine with as few assistants and as few instruments as possible. Apposition is best secured if the tissues are not distorted by bruising and when brought together in the simplest manner that meets the requirements. Complete hemostasis is essential. The last requirement, immobility, is obtained by a strip of adhesive plaster 6 inches wide, which completely surrounds the patient's abdomen. This makes a solid binder which holds the abdominal walls and the wound immobile. This is exactly the same principal as strapping a sprained ankle.

The ankle would slip under an ordinary bandage, but not so with the encircling adhesive binder which sticks and holds the parts firmly.

In recapitulation, we see the following advantages in doing abdominal work without retractors.

1. Smaller incisions.

2. Avoidance of bruising the tissues and injuring the abdominal muscles.

3. A lessened danger of sepsis by fewer assistants.

4. The increased chance of better work by the bringing up of the tissues into the wound.

5. The training of the operator's hand, the tactus eruditus, resulting in a tendency toward simplicity in technic which, after all, should be a surgeon's highest goal.

VERTEX OCCIPITO-POSTERIOR POSITIONS WITH SPECIAL REFERENCE TO THE SCANZONI MANEUVER.*

BY

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Much has been written concerning the management of occipito-posterior positions of the vertex. Various methods of procedure have been advocated for use when such positions are present. There seems, however, even at the present time, to be a considerable lack of unanimity of opinion, a failure on the part of men of experience to agree, upon the most acceptable method or methods to be employed. The writer realizes that the method which he favors has not been generally adopted and, in some quarters, has been strongly opposed. Therefore he offers the results of his experience with those cases.

Occipito-posterior positions of vertex presentations furnish a large percentage of the difficulties in which the physician finds himself entangled. They furnish most trying and, at times, apparently insuperable obstacles. The results of delivery under such conditions are often very unsatisfactory and, not infrequently, fatal to the child. More commonly it leaves the mother with more or less serious lacerations, exposes her to septic infection and a long period of, or even permanent, invalidism confronts her.

While it is the writer's intention to speak especially of a method

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of delivering the child in cases in which the faulty position is persistent, he desires to call attention to the fact that it is not only the second stage of labor which is unduly prolonged, but also that in the first stage of labor abnormal progress shows itself to such an extent as to have a direct bearing upon the progress of labor in the second stage. This is due, in a large per cent. of cases, to a very early rupture of the membranes and we have to deal at once with the problem of a dry labor. The head does not readily engage, and this and its tardy descent make dilatation of the os very slow.

Thus, not infrequently, after hours of good uterine contractions, there is little or no increase in the dilatation. To be sure, with moulding of the child's head which will occur in time, and with the formation of a large caput succedaneum, further dilatation may take place. Probably the usual practice in such cases is to wait for this to occur and, in the meantime, strive to gain a certain amount of rest for the patient by the occasional use of anodynes. Much may be said in favor of this procedure. To conserve the patient's strength during the long drawn-out first stage, is well worth our while.

A more scientific management of these cases, however, would seem to be artificial dilatation of the os uteri. The introduction of a Voorhees bag will bring about dilatation of the os very quickly; and, at the same time, it will stimulate the uterus to strong contractions. This must certainly appeal to us all, because this method replaces, artificially, something which is lacking—the bag of forewaters. It is the writer's conviction that one reason why so many cases of occipito-posterior positions come to forceps delivery, is that the patient becomes so fatigued and exhausted through a long drawn-out first stage, which involves loss of sleep and lack of nourishment, that little or no strength is left her with which to accomplish the second stage of labor, because of the excessive rotation of the head necessary to make delivery possible. Therefore, if the first stage is shortened by means of the colpeurynter, a larger proportion of patients will be able, of their own strength, to accomplish this rotation of the head and thus make possible a spontaneous delivery of the child. It, too, must be remembered that an excessively prolonged first stage increases the danger to the child, and, under these circumstances, a failing fetal heart and the passage of meconium furnish indications for a hurried delivery. When the membranes remain intact, there is little unusual about the first stage of labor.

In the writer's experience in about fifty per cent. of all cases of occipito-posterior positions rotate spontaneously or with minor assistance on his part. The following are the minor methods which are used by the writer to assist in the rotation of the fetal head: Postural treatment is of only slight benefit, but it may be used in the latter days of pregnancy, early in labor before the head has engaged, and before the membranes have ruptured. The knee-chest position offers a greater chance of throwing the child's back toward the median line of the anterior abdominal wall and thus favors rotation of the head more readily than does the lateral position. Another method which has given satisfactory results in a certain percentage of cases, is to secure further flexion of the head by making pressure with two fingers against the sinciput just in front and on either side of the anterior fontanelle during uterine contractions. This naturally favors descent of the occiput, flexion improves, and anterior rotation of the occiput is made possible. This anterior rotation of the occiput may be further assisted if the fingers, aiding the flexion, direct the sinciput upward and backward at the same time. Inserting the whole hand into the uterus for the purpose of rotating the head and body of the child is not regarded favorably by the writer, chiefly because it necessitates greater displacement of the presenting part.

Pituitary preparations, by increasing the force and efficiency of the uterine contractions, undoubtedly bring about the desired rotation of the head in a certain number of cases. But these preparations should be given cautiously, and only when the head is in the pelvis.

The special group of cases to which this paper has reference is that of the persistent occipito-posterior positions: those in which the head refuses to rotate either spontaneously or with the aid of any of the minor procedures above mentioned. In these cases the writer has uniformly adopted the so-called Scanzoni maneuver; it has served him well. Indeed, cases usually considered most trying were turned into comparatively simple cases. The writer has made use of this maneuver in 137 cases of occipito-posterior position. Of these, 97 cases were one-parae, 32 cases two-parae, 6 three-parae, and 2 four-parae. In 92 cases the position of the vertex was right occipito-posterior, in 45 cases the vertex was left occipito-posterior. In 61 cases the head was at the pelvic brim, the greatest diameter of it not having passed through. In 48 cases the head was in the pelvic cavity above the spines of the ischia and not entirely passed through the os. In 19 cases the head was in the pelvic cavity and had passed through the os, and in 9 cases the head was at the pelvic outlet. In 6 of the last 9 cases the occiput had rotated into the hollow of the sacrum, the sagittal suture lying practically in the anteroposterior diameter of the pelvis.

In all of these cases the head was rotated with the forceps to an anterior position of the occiput; after rotation the forceps were removed, re-applied, and the head delivered.

The rotation was always made through the smaller arc, *i.e.*, from *R.O.P.* to *R.O.A.*, from *L.O.P.* to *L.O.A.* The occiput was brought as nearly to the median line as possible and, in some cases, carried slightly beyond this point so as to overcorrect the position and overcome any tendency of the head to return to its old position after removal of the blades. In the cases of high- and medium-forceps the occiput rotated through an arc of about 100 to 150 degrees, while in those cases in which the occiput had rotated into the hollow of the sacrum, it was carried through an arc of about 180 degrees. In 109 of the cases the rotation was performed within the cervix; in 28 cases the rotation was done after the cervix had retracted completely or, at least, beyond the greatest circumference of the head. No especial difficulties were encountered, and the rotation was successfully completed in every case.

Inasmuch as success in this method depends entirely upon carefully following a definite technic, and failures are always due to a deviation in some details from this technic, an outline of the general plan of procedure is here given: Too great emphasis cannot be laid upon the making of a correct diagnosis of the exact position of the head. Too often the forceps are applied when the operator does not know the position of the head, consequently does not know how the forceps grasp the head. It is seldom that the sutures and fontanelles cannot be felt; but if, on account of a large caput succedaneum, the sutures cannot be readily made out one can, at least, pass the fingers up far enough to feel an ear and thus make sure of the position the head occupies. Forceps should never be applied until an exact diagnosis of the position of the head has been made.

In applying the forceps a cephalic application should be made; that is, the blades should lie upon the sides of the head diametrically opposite to each other. Any good forceps may be used. The writer prefers the solid blade forceps, because with them it is easier to make an accurate application. The blades slip over the maternal soft parts with ease during the rotation and they are subsequently more easily removed. In making the first application the blades are applied in such a way that the concavity of their pelvic curve looks toward the child's face. Thus in a case of vertex *R.O.P.* the forceps are applied as if one were dealing with a vertex *L.O.A.*

and in the case of vertex *L.O.P.* as if it were vertex *R.O.A.* In applying a blade, it is held with the fingers of one hand in a perpendicular manner, while two or more fingers of the other hand are passed into the pelvis to the side on which the blade is to lie, the tips of the fingers entering the os, if it has not entirely retracted. The blade then lies flat against the head and its tip passes along the palmar surface of the fingers between the head and the cervix. While inserting the blades, it is best to keep the handles well up toward the symphysis; this may be done by the thumb of the guiding hand. A slight rotary movement brings the posterior blade to the side of the head. The anterior blade is started in exactly the same way as the posterior; but, with the movement of inserting the blade into the pelvis is combined a rotary movement using a point, at about the junction of the blade and the shank, as a pivot. The result of these two movements carried out simultaneously is a spiral, sometimes spoken of as the Spiral of La Chappelle, and by the time the blade is inserted, it lies on the anterior side of the head. Attempts at rotating the blade around the head after it is completely inserted, meet with greater difficulty and often fail. After making sure that the blades are evenly applied, the handles are depressed somewhat toward the occiput, for, inasmuch as the head is usually poorly flexed this movement causes the blades to lie more nearly in the occipito-mental diameter. The forceps are then locked and the handles brought well up in the direction of the child's face, until the blades are in the axis of the pelvis. This movement tends to flex the head and may be aided, if necessary, by pressure with the fingers just in front of the anterior fontanelle. The handles are then grasped firmly to keep the forceps well locked, and are carried around with a swinging movement, through a large circle so that, at the completion of the rotation, they point almost directly downward. This large circular movement of the handles keeps the blades continually in the same axis during the rotation and causes the head to turn without difficulty. Failure to describe this circle with the handles is, probably, responsible for many of the failures to complete the rotation. The rotation may be done with one hand and, if the fingers of the other hand are kept on the post-fontanelle, any tendency of the blades to slip around the head may be detected. Slipping of the blades only occurs when a poor application has been made, for instance, when the blades grasp the head obliquely. Usually little force is required to rotate the head; and if one meets with some difficulty in the rotation it is usually overcome by pushing the head up to a slightly higher level in the pelvis. Manipulation rather than force gives success. After rotation has been accomplished the head is drawn down slightly to fix it in the new position. The forceps are then removed inasmuch as they are now upside down. They are then reapplied as in any occipito-anterior position and the head delivered. One important point in the second application is that the posterior blade should be applied first whether it is the right or the left. This tends to prevent the head from slipping back to its old position.

Thus the important points in the procedure are: (*a*) The correct diagnosis of the position of the head. (*b*) The true cephalic application of the forceps. (*c*) The simple rotation of the head, without traction, by a large swinging movement of the handles. (*d*) Drawing the head down slightly before removing the blades. (*e*) The application of the posterior blade first in reapplying the forceps.

It will be noticed in the foregoing description that rotation of the head is always performed first, that is before any attempts at traction are made, and that the rotation is carried on absolutely independently of traction. In early experience with the Scanzoni maneuver it was the writer's idea that the proper place to rotate the head was low in the pelvis and after it had passed completely through the cervix. Thus in cases in which the head remained at the pelvic brim, or in the pelvis, but still within the cervix, an attempt was made to first draw it down while still in its posterior position and to rotate it only after it had passed through the cervix. The reason for this plan was a feeling that with attempts to rotate within the cervix, there was associated an extra danger of lacerations. Subsequent experience, however, has taught that in a certain number of cases the head cannot be drawn down into the pelvis while lying in a posterior position and that attempts at traction often result in the slipping of the forceps because of an unnatural application, and in consequent injuries to the maternal soft parts as well as to the child's head. Cases have been seen in consultation in which great traction force was used by one or more physicians in an attempt to deliver the child, with no success whatever, and in these same cases it was found that after rotation to an anterior position very little force was needed to accomplish delivery. Injury to the cervix during rotation of the head was not observed in any of the cases, nor did we observe lacerations of the perineum or of the vaginal wall. Lacerations which did occur were only those which would have taken place if the position of the head had been normal from the start. Hence the present plan of rotating the head to an anterior position before any traction is made is advocated whether the head be at the pelvic brim, in the pelvis, at the outlet, or whether it is still within the cervix or not.

The plan of rotating the head, removing the forceps, and allowing the patient to come from under the anesthetic and then wait for a spontaneous delivery has not been followed.

The scientific precision of the maneuver in converting an abnormal position into a normal one and then permitting a normal mechanism of labor, would seem to stamp it an operation far preferable to methods of delivery which consist of a pelvic application of the forceps with subsequent delivery, the operator allowing the occiput to remain posterior in the hope that the head will rotate within the forceps during the traction. Such operations necessitate the use of far more force and, if the occiput remains to the rear, the danger of laceration of the perineum is increased inasmuch as the vulvar orifice must be dilated to a greater circumference of the head than is the case when the occiput is to the front. The method of making a reverse application of the forceps originally, so that no reapplication will be necessary, is so difficult and confusing as to be impracticable except, possibly, in cases in which the sagittal suture is almost transverse. Podalic version cannot be recommended in that it necessitates a still more abnormal delivery with its self-evident accompanying dangers.

In conclusion we may say that the use of the Scanzoni maneuver makes the management of posterior-positions of the occiput comparatively easy. It may be performed successfully in practically every case, failures being due, as a rule, to deviations from the important steps in the technic, especially that part in which the handles of the forceps describe a large circle during the rotation. The dangers of the procedure, both to the mother and the child, are minimal; and lacerations, when occurring, are only those resulting from the delivery subsequent to rotation.

The writer has found it one of the most useful and gratifying procedures in obstetric practice and would bespeak for it a more general adoption.

The Osborne.

VAGINAL CESAREAN SECTION FOR ECLAMPSIA AND OTHER CONDITIONS.*

BY

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In advocating vaginal Cesarean section for the treatment of eclampsia, it is not the purpose of this paper to hold that it is the *only* treatment in this condition; but, admitting pregnancy as the exciting cause of the convulsions, the writer maintains that this method of emptying the uterus is the quickest and best, after the third month of pregnancy.

To Peterson of Ann Arbor, probably, belongs the credit of bringing this operation fully before the profession in this country. It is not my purpose to burden you with a large array of statistics bearing upon this subject, but more to lay before you the indications and technic for vaginal Cesarean section for this condition, and to report a series of fourteen cases treated by this method.

We must all agree that the tendency of obstetric procedure has been conservatism; the least amount of interference has been the key-note of all the teaching. It seems as though the results obtained by the early operators has made such an unfavorable impression upon the profession, that the progress in obstetrics has been slow—much more so than in any of the other specialties.

Whatever the cause of eclampsia may be, all authorities seem inclined to agree that the prognosis improves after the uterus is emptied. If that be the case, then the question arises, what is the best method of emptying the uterus? Is it manual, instrumental, or bag dilatation? The writer prefers vaginal Cesarean section, or vaginal hysterotomy.

The indications for the rapid emptying of the uterus are briefly stated as follows: Eclampsia with or without convulsions; central placenta previa; accidental hemorrhage; prolapse of cord; dangerous heart condition in mother; advanced tuberculosis in mother, and hemorrhages, due to malignancy or hydatid mole.

It is my purpose to report cases of eclampsia, central placenta previa, accidental hemorrhage, and of valvular heart lesion, in which the uterus was emptied with satisfactory results with the aid of vaginal

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hysterotomy. Those who have dilated, manually, a hard unyielding cervix know what a long tiresome unsatisfactory process it is. I do not believe that the cervix under these conditions can be dilated without tearing. The operator in attempting to dilate a rigid or diseased cervix, manually or with instruments, simply tears this organ on one side or the other. Severe hemorrhage is the results, which further weakens the patient and opens new avenues for infection. Then, too, the element of time, which is so important, must not be lost sight of.

How different is the method of vaginal hysterotomy? It is a clean surgical procedure, requiring few assistants and not necessarily a hospital operating room. It is an operation that can be performed anywhere and at any time, with no more danger to the patient than there is in doing a version. The preparation of the patient is the same as for any other vaginal operation: An enema of soap and water; shave the external genitalia thoroughly; sterilize the vagina with soap and water and irrigate copiously with normal saline solution, and empty the bladder with the catheter.

The patient is placed in the lithotomy position on a table well padded and covered with a Kelly pad. Her legs are supported by two assistants or, if no assistants are at hand, are held well flexed by an ordinary leg-holder. A weighted speculum is then introduced into the vagina; and, if assistants are at hand, two smaller specula are used to draw the sides of the vagina apart. This, however, is not absolutely necessary, but it facilitates the work of the operator. Then two single-tooth tenacula forceps are hooked into the anterior lip of the cervix, which is then drawn down as far as possible, and firmly held there. Two strands of silkworm gut can be used for the same purpose. Then a transverse cut is made with a knife, or pair of scissors at the point of union of the cervix and anterior vaginal wall. This opening may extend on either side as far as is needed. The depth of the incision extends to the point where the tissue peels easily with a piece of gauze. At this point there is no bleeding. The bladder is thus separated and pushed upward and out of the way. Thus the anterior lip of the cervix and bladder are entirely separated. If more room is required, the posterior cervical lip is treated in the same manner, separating it from the rectum. There is, usually, very little hemorrhage. Then with a long pair of straight scissors a cut is made in the median line along the anterior lip of the cervix, extending up as far as needed to introduce the whole hand into the uterine cavity. The posterior lip of the cervix can be treated to a similar incision if more room is required. It is better to have two incisions than to be cramped for room. The membranes are then ruptured and the child delivered with the aid of the forceps or version. The placenta and membranes are delivered immediately.

The repair work is done in the reverse order beginning in the upper angles of the uterine wound. Chromic catgut No. 2 in a curved needle placing the sutures, interruptedly or continuously, down to the external os. The transverse incision is then closed with a continuous suture of plain catgut. It is well to provide drainage in this incision. To prevent the formation of a hematoma. The patient is then put to bed, and treated in the usual manner following operations in the vagina.

What is the danger to the child in this procedure? No more, nor less, than that which depends upon the existing toxemia, or any other condition which demands the operation.

What are the dangers to the mother? The principle danger appears to be injury to the bladder, either when the incision is made or by subsequent sloughing. In 530 cases of vaginal hysterotomy Peterson found nine bladder injuries. Hemorrhage should not constitute a serious complication. The danger of sepsis always exists, but in careful hands, it is reduced to a minimum. The effect of the operation upon succeeding childbirth is somewhat uncertain; however, no serious results have been reported so far. I wish to report the following cases:

CASE I.—Mrs. G., German, aet. forty-one para-x. Duration of pregnancy, eight months. Saw patient in consultation with Drs. Frank McGuire and Geo. B. Stocker, June 21, 1911, with a view to terminate her pregnancy on account of chronic heart disease. Patient's condition was alarming. She was unable to lie down; feet were badly swollen, and breathing difficult. We determined to wait till full term, if possible; but, after watching for one week, I was sent for again. Her blood pressure at this time was 220. On June 27, Dr. Stocker administered ether; and, with the assistance of one nurse, I delivered her in her home of a live baby with the aid of vaginal Cesarean section. Duration of operation, twenty minutes. The patient died two months later of heart disease.

CASE II.—Mrs. W., German, aet forty, para-vi. Duration of pregnancy, eighth months plus. Patient was seen at 1 P. M., November 9, 1911. She had had "several" convulsions in the morning. No dilatation of cervix. We took her to St. Mary's Hospital at 4 P. M. Had convulsions while on the way there. Vaginal Cesarean section was performed at 5.30 P. M. Child lived. Patient had five convulsions during the following night, but made a good recovery. This was the second time I had attended this woman in eclampsia.

CASE III.—Sophie C., unmarried, aet eighteen. Entered St. Mary's

Hospital at 2 A. M., February 3, 1912. History of headache, loss of vision, and convulsions during previous day. Urine loaded with albumen. Vaginal Cesarean section was performed at once. Male child was delivered alive, but died shortly after. This patient continued to have convulsions, and died at 1.30 P. M. Consciousness never returned during the intervals of the attacks. According to Dr. Zinke, the prognosis in these cases is always bad.

CASE IV.—Julia M., married, aged nineteen. Full term, pregnant for first time. Saw her February 15, 1912, with Dr. James P. Barr, at 10 A. M. The day before she had eight convulsions. The day I saw her, she had had four convulsions. Urine scanty and boiled solid in tube. Vision poor and headache. Taken to St. Mary's Hospital, February 15, where I delivered her of a live child. Operation and repair took forty-five minutes. She was given croton oil, hot-air baths, and fluids. She did well for three days, when she had one convulsion. No more after that, and mother and child left hospital in good condition. Have since learned she was pregnant again, but have had no chance to examine her.

CASE V.—Mrs. B., aged twenty, seen March 26, 1912, at St. Mary's Hospital with Dr. J. H. Donnelly. Pregnant for the first time. No urine in bladder; tongue coated. Had had numerous convulsions during the day. Uterus emptied by vaginal Cesarean method, cervix admitting only one finger. Child was dead. Mother died at 4 P. M. same day. Another of the type of cases that does not regain consciousness between convulsions.

CASE VI.—Mrs. G., aged twenty-one. Seen with Dr. Hengerer, at the German Hospital, July 22, 1912, at 10 P. M. Had had four convulsions; urine scanty and boiled solid. By the vaginal Cesarean method, I delivered her of a male child, doing version. Mother and child left hospital in good condition. No convulsions following delivery.

CASE VII.—Mrs. C., aged forty. Pregnant for ninth time. Seen with Dr. E. E. Koehler at her home, February 10, 1913. From condition of patient, I diagnosed internal hemorrhage, probably from loosened placenta due to injury. Her condition was extremely critical. I did a vaginal Cesarean section at once, no anesthetic being used. Found placenta loose in uterus, and uterus full of blood; baby dead. Patient put to bed but died shortly after. No doubt this patient could have been saved, had the midwife who was first in attendance called for help sooner.

CASE VIII.—Maria F., aged twenty-five. Seen at Buffalo General Hospital, February 12, 1913. Pregnant for the first time; had had nine convulsions after entering hospital. Urine contained albumen and casts, 60 grams of albumen to 1000 c.c. of urine. Delivered by vaginal Cesarean section of live child, which lived seven hours. Patient had no convulsions after delivery, and left hospital in good condition.

CASE IX.—Mrs. D., aged twenty-two. Pregnant for first time. Seen at Buffalo General Hospital, March 2, 1913, with Dr. Van Peyma, at 8 P. M. Patient admitted at 3.30 P. M. Urine scanty and boiled solid in tube. Unconscious and blind, having convulsions when admitted. She was given veratrum; was bled from the arm; saline under skin. At 10 P. M. Dr. Getman heard fetal sounds; at 10.30 P. M. I did vaginal Cesarean, delivering by version, a stillborn baby. Patient recovered.

CASE X.—Mrs. C., pregnant for first time. Aged, twenty-four. Sent to St. Mary's Hospital by her physician, Dr. Hill, of Ferry Street. Patient had had numerous convulsions during the forenoon. Husband did not know what they were until told by Dr. Hill. Vaginal Cesarean section at 2 P. M. Child alive. Patient had no more convulsions, and left hospital in good condition.

CASE XI.—Mrs. W., aged twenty-two; first time pregnant. Entered St. Mary's Hospital, May 20, 1913. Seen with her physician, Dr. Flannery. Had had five convulsions before entering hospital. Delivered of stillborn child at 3 A. M., ten convulsions following delivery. Given veratrum veridi, pulse dropped to 60. No convulsions on following day. Patient was seven months pregnant. Left hospital in good condition.

CASE XII.—Mary K., twenty-nine years old, third time pregnant. Sent from Sisters' Hospital to St. Mary's Hospital, June 13, 1913. Mental condition cloudy; urine scant and contained albumen and casts (2 grams to 1000 c.c. of urine). Was treated by sweats, catharsis and fluids until June 16, when she became worse, and I delivered her of a live baby by vaginal Cesarean section at 3 P. M. Baby lived one-half hour, and mother died at 5 A. M. following day.

I think I did wrong to wait as I did. She should have been delivered sooner, but, as she had no convulsions, I thought best to wait.

CASE XIII.—Vaginal Cesarean section for central placenta previa. Mrs. E., aged thirty-three. Pregnant first time. Seen with Dr. Edmonds and Dr. McDowell. Patient full term. Seen 1.15 A. M., September 7, 1913. Diagnosis: central placenta previa. No fetal movements felt for past ten days. First hemorrhage, one month previous—severe. Second hemorrhage, one week before—not so severe. On September 7 had a severe hemorrhage. I found cervix not dilated; bleeding profuse. I did a vaginal Cesarean section, delivering stillborn baby through the placenta. Patient made a good recovery. This would have been a case for abdominal Cesarean section, had there been a live child.

CASE XIV.—Mrs. M., aged twenty-three. Pregnant first time; seen with Dr .C. E. Abbott, December 13, 1913, at St. Mary's Hospital. Patient had been in hospital for three days under Dr. Abbott's care for threatened eclampsia. Blood pressure ranging between 180 and 220. First convulsion 5.30 A. M., December 13; second one at 8.30, A. M. I did a vaginal Cesarean section, delivering live baby. Blood pressure after delivery 180. Two convulsions following delivery. Veratrum given. Urine increased second twenty-four hours after delivery to 118 ounces. Mother and child left hospital in good condition.

This completes the history of these cases. It is unfortunate that we cannot always follow up these cases, especially with reference to future pregnancy.

I regret exceedingly that I did not deliver Case XII sooner. Possibly she might have lived.

THE TREATMENT OF ECLAMPSIA.*

BY

ADAM P. LEIGHTON, JR., M. D., L. M. (DUBLIN),
Portland, Maine.

It is doubtful if any consideration of disease therapy presents a wider divergence of opinion and ideas than that involved in a discussion of the time-worn subject of eclampsia and its treatment. Our ignorance of the true etiology of the disorder, combined with the altogether empirical treatment now in vogue, is alone responsible. On one hand we have the advocate of strict conservatism, on the other the advocate of immediate radical operative treatment. There seems to be no "middle ground" between these two factions.

Papers written on the subject of eclampsia are apt to be decidedly similar, generally incorporating numerous theoretical explanations to prove its origin and advocating either a distinctly conservative or active operative treatment, coincident with the author's personal preference. This short dissertation will prove to be no exception, for my somewhat limited experience in the practice of obstetrics precludes the possibility of any true originality.

I have, however, the temerity to offer for discussion, the so-called "Dublin Method" of treatment, or the "Morphine Treatment," as it is wrongly called (for morphine, while playing a most important part, is not the most necessary detail), mentioning its technic in full, combined with a brief recital of statistics, and interspersed with a small amount of personal comment regarding the application and limits of this therapy. It is not a "cure-all" in any sense of the word, and in some cases it may seem to fail and other treatment to be indicated, but I maintain that it gives the best results in the treatment of eclampsia, known to the medical world, if properly, conscientiously and thoroughly applied.

This conservative method of handling eclampsia by avoiding immediate operative interference, and relying upon the use of morphia with combined elimination, is not a new idea. It may be said to be only a revival of an old time practice, much in use several

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* Read before the Twenty-seventh Annual Meeting of the American Association of Obstetricians and Gynecologists at Buffalo, September 15–17, 1914.

decades ago, which was gradually forced to the background to allow for the more general practice of accouchment forcé or early operative treatment in actual eclampsia. Now, however, it seems that the tide is turning to again favor this conservatism, and accouchment forcé finds increasing disfavor.

The results obtained by adhering to the rules of technic systematized and recommended by Hastings Tweedy of Dublin, will clearly demonstrate the superiority of this therapy over any other. Accouchment forcé in eclampsia is contraindicated and especially harmful. Its chief objectionable point lies in the fact that it leads to severe shock of the already poisoned, irritated nervous system, and it is this shock imposed by immediate delivery after rapid artificial cervical dilitation that oftentimes kills the eclamptic.

I will grant that delivery of the child in the preeclamptic and convulsive stage is to be desired, but not as an important curative agency. Pregnancy must, of course, be considered a predisposing cause of eclampsia, but I doubt if the uterine contents is the actual exciting cause. We are aware of the deleterious effect of the toxemia or eclamptic poison on the child and that it is this, which adds considerably to the fetal mortality, so for that reason we would possibly obviate the death of the child by early delivery. Because of the truth of this statement, I believe that it is good treatment to induce labor in a patient, who being near to, or at, full term, shows aggravating and increasing preeclamptic symptoms. There is little shock entailed and it may be safely and successfully obtained by the use of a Cooke's ring and cervical packing. However, in actual eclampsia we have a different condition of affairs, and to attempt forcible delivery would be the wrong procedure, the reasons having been previously stated.

The treatment of eclampsia should be properly considered under two heads—prophylactic and curative. I shall neglect reference to the former as the rules for the proper hygiene of pregnancy are too well known to allow for tiresome repetition.

The Dublin method of treatment rests upon four principles:

1. Delivery when possible only. Accouchment forcé is not advocated in any form.
2. Limit metabolism and avoid further metabolism. This is done by starvation, morphine and gastric lavage.
3. Aid excretion. Purging and irrigation of the bowels. Sweating is never done! Bleeding in specially selected cases. Infusion of the breasts with a sodium bicarbonate solution. Saline is not used as it is not eliminated in kidney

disease and it leads to locking up of fluid in the more solid tissues.

4. Treatment of special signs, such as respiratory weakness, cardiac weakness, etc. Morphine is used only to control the fits.

On commencement of the treatment, one-half grain of morphine is given, followed every two hours with a quarter grain while the fits persist, until two grains in the twenty-four hours are given. Three grains may be given in many cases. When respirations fall to six or seven a minute, it is an indication that the limit for administration of morphine has been reached. Scopolamine or atropine may be substituted.

The stomach is washed out and a purgative poured through the tube. There is no importance to the nature of the purgative; it must be efficient. After stomach washing, a catheter is passed, the urine drawn, measured and examined. The patient is turned on her side and the rectum and lower bowel thoroughly washed out with a solution of sodium bicarbonate through a long rubber colon tube. Lavage must be very thorough and the procedure persisted in until large amounts of fecal matter have been washed out. The passing of the colon tube is a most important question of technic. The simple introduction of the tube through the anal opening until the greater part has disappeared is no proof that the tube has passed to the sigmoid. On the other hand, more frequently does it curl up in the pouch of the rectum; therefore, we only get a return flow from the rectum during irrigation. A digital rectal examination should be made in each case to insure the proper insertion of the tube.

When the bowel is well cleared, leave one and a half pints of the sodium bicarbonate solution in the rectum. One other point is well worth mentioning, I have noted that the irrigation is productive of better results if massage of the abdomen is combined.

If the urine remains scanty, submammary infusion of the same kind of a solution is practised. Lay the comatose patient on her side, almost on her face, so that the mucus may run out. This is a matter of great importance, for if a patient lies on her back, mucus and saliva trickles over the insensitive larynx and adds to the edema of the lungs. I have no doubt but that this is the most fruitful cause of the pulmonary edema of eclamptics.

Labor is never induced at this juncture, but if it should take place (as it generally does) its progress, as a rule, is never interfered with. When labor has continued to a point where the os is sufficiently dilated, forceps may be applied and the patient aided in her delivery.

The treatment outlined by Stroganoff of St. Petersburg, is similar, except that he uses chloral in large doses, by the rectum, in conjunction with the morphia. Irrigation, examination, lavage, etc., is done with light chloroform anesthesia.

With this condensed presentment of the treatment, may I give a few figures and statistics on which to base my argument in favor of the conservative or expectant treatment?

The rate of mortality in the United States, gathered from nine leading lying-in hospitals during the recent period of five'years, is 38.4 per cent. in seventy-eight cases. The Royal Maternity of Edinburgh gives 66.6 per cent. Guy's Hospital in London about 25 per cent. Williams gives a mortality of 20 per cent. to 25 per cent. DeLee gives over 20 per cent. McPherson of the New York Lying-in Hospital states that theirs is 30.8 per cent. Engleman gives 21 per cent. Edgar states his as 20 per cent. Duhrssen, of vaginal Cesarean fame, gives 16 per cent. These figures are all given by men who believe in accouchement forcé or immediate delivery.

Now let us note the results gained by Stronganoff and Tweedy, these men, as I have before mentioned, following modes of treatment which are nearly identical. From 1903 to 1910, Tweedy treated sixty-six cases after his method, with six deaths, a mortality of 9.9 per cent. In the year 1911, he treated eight more without any deaths, hence his record is 8.11 per cent. in seventy-four cases. Since that year, he tells me that he has materially decreased that per cent. of mortality.

Stronganoff has treated personally three hundred and sixty cases of eclampsia, with a maternal mortality of 6.6 per cent. and a fetal mortality of 21.6 per cent. Six hundred cases have been treated in Russia according to his method, with a maternal mortality of 8 per cent. and a fetal mortality of 21 per cent. Sixty-one cases have been treated in Germany in the same way with a maternal mortality of 6.5 per cent. and a fetal mortality of 18 per cent. Roth recently reported from Dresden thirty-one cases so treated with only one casualty.

These statistics must command one's attention. They are gleaned from the results of the treatment of a large number of cases extending over a long period of time. I realize that medical journals are replete with statistics and reports of special treatments for this disease, and that the results are uniformly good in most cases, as indicated in per cent. mortality, but can any of them show results like unto those which I have just stated? Tweedy's fetal mortality in the seventy-four cases just mentioned was 30 per cent. Stronganoff's I quoted with his maternal mortality. Fetal mortality in our text-books, outside of expectant treatment, is generally given from 33 per cent. to 50 per cent.

As far as abdominal Cesarean section is concerned, it must be admitted that perhaps here we have the solution of the question in some cases. I doubt if we may place it within the limits of strict conservatism, but I venture to say that occasionally we will resort to its use in eclampsia. Theoretically, Cesarean section would seem to be the most rational method of treatment in eclampsia, if one considers that the child in utero is the actual exciting cause of the disease. Too, acting upon this assumption, immediate evacuation of the uterus is desired. Comparing the results obtained by the several forms of accouchement forcé, with the results gained through Cesarean section (as have been presented by Peterson of Ann Arbor and others) it is evident that fetal and maternal mortality is materially lessened by the latter therapy. However, the statistics show that the per cent. mortality is much greater than that resulting from conservative treatment, such as I have outlined in this paper.

Some cases of active eclampsia demand immediate operative treatment. I should not want to see a woman die undelivered for obvious reasons, and eclampsia of a fulminating variety in which the symptoms steadily increase and which are not properly controlled by sedative and eliminative treatment, indicates operative interference. Here Cesarean section should be considered.

The most valuable point in the treatment of eclampsia with perhaps the single exception of the administration of morphine in sufficient amounts to control the fits, is ELIMINATION! Elimination in this sense means a great deal more than simply giving an enema and a cathartic. It means that the attendant must give hours of time to the proper eliminative technic. Prolonged irrigation of the bowels will bring forth extraordinary amounts of putrefactive intestinal debris and fecal material. This is of prime importance as a curative agency.

Two other points of value in the treatment of this malady are attention to the diet and venesection. Starvation should be practised for three days following the return of consciousness, then when food finally has to be given it should be of the blandest sort. I find that a diet of malted milk made with water is adequate for some days, administering it in small quantities. The harmful effect of food at these times has been satisfactorily proven in the few cases which have come to my attention, and I am convinced that food plays a most important part in the etiology of eclampsia, if it is not the actual exciting cause. In the preeclamptic stage there is aberration of digestion and in the period of unconsciousness digestion is absolutely in abeyance. It is at these times that food exerts its most harmful action. We all think, too, that we are supporting the patient's strength and enhancing the ultimate possibility of recovery by administering nourishment after a woman has struggled to consciousness through this terrible disease. This is the mistake. We should withhold food for a considerable length of time. I have no doubt that proteid and foods of a large nitrogenous content are the chief trouble makers. For this reason it seems that carbohydrates are more desirable when nourishment finally has to be given.

In venesection we certainly have a valuable aid in the treatment of some cases. A high blood-pressure with cyanosis suggests venesection, and decided benefit is gained by the loss of some 500 c.c. of blood. The withdrawal of a pint of blood removes considerable poison and also favors diuresis. I believe that many of the good results gained by immediate delivery and credited to the fact that the uterus was emptied, really are due to the excessive hemorrhage at the time. Zweifel, since April, 1911, has applied venesection in eighty-nine cases, combined with the Stroganoff treatment, and has greatly improved his maternal mortality. This therapeutic measure of venesection was much in use fifty years ago, but suddenly fell into disuse. However, it seems at present that there is a tendency to once again employ it more generally.

In the treatment of eclampsia, then, avoid first accouchment forcé. Vapor baths, or any means to promote diaphoresis, are obviously improper methods. Eclamptics are suffering from a paucity of fluid in the circulation, and this in spite of the tissues being possibly solid with edema. What is wanted is a less saturated condition of the blood, and it is impossible to suppose that profuse sweating can have any other action than to increase this abnormality. Only a minimum of toxins can be thus eliminated, if any.

No other disease better repays the attendant for personal supervision. Patients with profound toxemia make a slow recovery. Elimination is always slow. Heart failure may supervene, although no new poison may be added to the blood. For these reasons a certain number of deaths must be expected; nevertheless, it is impossible any longer to pretend that the treatment of eclampsia is either empirical or useless.

TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

Meeting of November 5th.

The President, George Erety Shoemaker, M. D., *in the Chair.*

Dr. George W. Outerbridge presented a specimen of

CHORION-EPITHELIOMA WITH SEVERE INTRAPERITONEAL HEMORRHAGE.

The patient from whom this specimen was obtained was operated upon at the Gynecean Hospital by Dr. Theodore A. Erck, to whom I am indebted for the privilege of presenting it. In October, 1913, the patient, a young married woman, was curetted at another hospital for a supposed incomplete abortion. The surgeon at the time is said to have remarked that the material removed was suggestive of a hydatid mole, but so far as can be ascertained no microscopic examination was made. Following this the patient had irregular menstruation for a few months, then a number of regular periods, and in the early summer of 1914 again was troubled with irregular bleeding, for which she was treated with the ordinary styptics. The bleeding stopped, and in September the patient thought herself pregnant. In October the period was missed entirely, but a few days after it would have been due the patient was suddenly seized one morning, while at a hairdresser's, with very violent abdominal pain which caused her to faint. Examination at this time disclosed an extremely tender and rigid abdomen, with a tender mass distinctly palpable in the vaginal vault. Under the diagnosis of a ruptured ectopic pregnancy she was hurried to the hospital for operation.

At operation the pelvic cavity was found filled with a very large amount of free and clotted blood. A rapid supravaginal hysterectomy was performed, and the patient, although in desperate condition, eventually recovered. The specimen consists of uterus, both tubes and ovaries. The tubes are entirely normal; the ovaries are both somewhat enlarged, due to the presence of several follicular cysts. The uterus is slightly enlarged, and presents in its fundal region two small nodular excrescences, each about 1 cm. in diameter, one of which is congested and distinctly softened, but is covered by smooth serosa; the other presents a reddish eroded surface, over which the serosa is lacking, and through which area a probe can be passed deeply into the uterine wall. On section the uterine wall is found to be about normal in thickness save at the fundus, where this is somewhat increased. Situated at this point is a tumor measuring about 3 × 2 cm., containing in the center a ragged cavity filled with blood clot, and communicating directly with the erosion through the external surface. The uterine cavity and endometrium are entirely uninvolved, this explaining the absence of external hemorrhage in the latter months. Microscopically, the growth is seen to be a characteristic chorion-epithelioma, which has pursued this exceedingly unusual course of development. Its origin is probably to be explained by a bit of chorionic epithelium having originally been swept into a vein in the thickness of the uterine wall, and undergoing development at that point.

DR. F. HURST MAIER exhibited a specimen of

CANCER OF THE UTERUS.

The cancer in this case, which has several points of interest, was removed ten days ago from a woman seventy-nine years of age. The patient had no discharge from the uterus for thirty years until the middle of September, when there was a flow of blood for three days. The cessation of the flow was followed by a second hemorrhage in the middle of October. In the interval there was slight serosanguinolent discharge. An examination by means of a uterine sound demonstrated the presence of a friable intrauterine growth. The growth, as you can see, is about the size of an English walnut, and is attached to the wall by a pedicle. Histologically it is a cylindric-celled carcinoma. The patient not only stood the operation well, but made an unusually quick recovery.

DR. GEORGE P. MÜLLER spoke on

THE RELATION OF BLOOD PRESSURE TO SURGICAL OPERATIONS AND SURGICAL SHOCK.

Something over ten years ago the subject of blood pressure excited great attention and we had the papers and instruments of Janeway, Erlanger, Stanton, Cook, and Briggs, etc., presented to us and a wave of enthusiasm was started in this country resulting in much writing and additional instruments. The routine use of blood pressure estimation by surgeons has not persisted, because I find upon inquiry at ten hospitals not connected with the medical schools that the blood pressure is practically never taken on the surgical side. On Dr. Frazier's service in the University Hospital we have estimated the blood pressure routinely in the past, both before, during, and after operation, but at the present time confine ourselves to its routine use in operations upon the cranial cavity and spine and its occasional use in other cases where shock is thought likely to occur. We find at the present time that the estimation of the blood pressure as indicating the beginning of shock in abdominal cases is deceptive, owing to the influence of the splenic stimulation. It is frequently used in the wards to estimate the relation of certain drugs that we want to use to raise or lower blood pressure. We frequently hear the use of the blood pressure instrument decried, but we must remember that this statement is made by those who have never correctly grasped the importance of the instrument. It is like the thermometer which registers the amount of heat but does not tell us where it comes from; so the blood pressure instrument tells us exactly the systolic and diastolic pressure but does not tell us what causes their increase or decrease. Even the experts are frequently in error in estimating the blood pressure without the aid of an instrument. Its importance in surgery may be summarized as follows:

1. *The Anticipation of Possible Complications.*—(*a*) Hypertension. A systolic pressure constantly above 160 or a diastolic pressure constantly above 100 is pathologic at any age. A disproportionately high blood pressure calls for an investigation of the renal function by modern means. The importance of this "sign-post" cannot be overestimated, because sometimes these patients complain of respiratory or gastrointestinal symptoms and may be diagnosed as gall-stones. Simple hypertension due to various causes such as arteriosclerosis is seen in a very small percentage of cases, the majority of cases of hypertension being associated with renal disease, but in either event apoplexy, uremia, pulmonary edema, etc., may occur suddenly after operation.

(*b*) Hypotension. A persistent low blood pressure is seen in some people as a normal phenomena in so far as we know. It is seen in those cases of visceroptosis and is lowest in the advanced cases. In carcinoma, tuberculosis, anemias, etc., a low blood pressure is the rule. In patients with hypotension the heart may be weak and if they become shocked from operation, caution should be exercised in using large doses of the vaso-constricting agents. These patients, especially the visceroptosis cases, require careful preliminary treatment, and the operation should be surrounded with all of the accessories commonly called anoci-association in order to minimize the further lowering of blood pressure.

2. *In Recognizing Shock and Controlling Its Treatment.*—Here the estimation of the blood pressure is invaluable. We have not the time to discuss shock, its many theories, and the various contradictions that are flying back and forth in the literature at the present day. While it is true that the clinical appearance of shock sometimes comes on a few moments before the blood pressure falls, yet we must remember that we are not bound to the indications of the instrument, but should be ready at any time to institute treatment if the patient's condition demands such treatment. I still believe the theory of Crile that vasomotor exhaustion accounts for the condition of shock most commonly seen during surgical operations; but it is not necessary that this exhaustion be so profound that no response can be elicited by further stimulation. One may be utterly exhausted and yet be capable of one more effort. By means of the blood pressure we can estimate whether the salt solution, the soda bicarbonate solution, the glucose solution, the pituitary extract, or the epinephrin are raising blood pressure, or whether the use of the drugs together with the other methods of treatment are helping the patient.

We find that the blood pressure estimation is of especial use in head and spine surgery, in prostatic cases, in operations upon the thigh, such as high amputations, the plating of old fractures of the femur, etc.

Dr. Müller then exhibited lantern slides illustrating the importance of blood pressure in surgery, some of which were made by Dr. Frazier over ten years ago.

DR. BARTON COOKE HIRST spoke on

EXPERIENCES WITH BLOOD PRESSURE ESTIMATES IN PREGNANCY.

There is little new to be said on this subject. Ever since I saw Mangiagalli's statement that a rise of blood pressure is more significant of the toxemia of late gestation than changes in the urine or any other symptom, I have had systematic estimates made in the University Maternity and in my private practice. In the latter I have my patients come to the office or I go to them, every two weeks throughout pregnancy and every week in its last month, for this purpose, getting a specimen of urine in the intervening week or half week.

Like every one else who has had much experience with it, I find a rising systolic pressure the most valuable and constant symptom of late gestational toxemia, the toxemia of early pregnancy with vomiting as its chief manifestation, on the contrary, giving a low pressure, with the exception of cases of hydatidiform mole in which the pressure is high, up to 180 as early as the third month.

The usual systolic pressure with which an eclamptic case enters the hospital is about 180, but severe cases come in sometimes with pressures around 140. In the course of treatment the pressure, may suddenly sink, an indication for stimulation and the intermission of eliminative measures. One hundred and eighty or over is an indication in my hospital service for venesection. The other measures reducing blood pressures most successfully are puncture of the membranes, sweating, purgation, veratrum viride. I have seen the first-named procedure reduce the pressure 100 points in a few minutes from 236 to 136.

It is interesting to observe that blood pressure keeps high in eclamptic cases for ten days or more after the disappearance of all other symptoms. This fact should warn us not to interrupt the eliminative, dietetic and other treatment too suddenly or too soon, for fear of a recurrence, which I have seen in its original intensity, four days after recovery from the first attack in a puerperal case.

The blood pressure has a valuable prognostic significance. A falling pressure with improvement of the other symptoms presages recovery. A falling pressure with aggravation of the other symptoms is a precursor of death.

DR. DAVID RIESMAN read a paper on

THE LIMITS OF SAFETY IN BLOOD-PRESSURE CHANGES.*

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* See original article, page 428.

DISCUSSION.

Dr. Richard C. Norris.—My knowledge of this subject is based entirely upon my experience, and I am incapable of discussing the theoretical aspects of altered blood pressures. One thing which seems to me to be very sure is that there is much to be learned about blood pressure in many phases in which it presents itself in obstetric practice. I have felt sometimes that a deeper knowledge of the ductless glands would show a relation between pregnancy and blood pressure about which we know little at the present time. The study of blood pressure in pregnant women is, however, as essential as a study of the urine. It is a routine with me in my private practice to take the blood pressure as often as I examine the urine. At the Retreat we have not this frequent opportunity for repeated examinations since the patients come late in pregnancy, but we have observations of all cases, and I have asked Dr. Barnard to go over the last 200 cases, including the toxemic and eclamptic cases, and present his deductions to you this evening. In my private work the average blood pressure in the early months of pregnancy is from 110 to 130. As pregnancy advances there is little change. In eclamptic cases at the hospital, no matter how active our treatment may be, if the blood pressure is above 180, eliminative treatment has but a very small and temporary effect upon it. Many such cases, even after delivery and after all danger of convulsions has ceased, carry a persistently high pressure for weeks after recovery. Very high pressures in pregnant women sooner or later are followed by grave kidney symptoms and usually alone call for active eliminative treatment and premature induction of labor. In gynecological work I have been struck with the frequency of high blood pressure about the menopause. This makes me think of the possible relation of the ductless glands to many conditions associated with the menopause. High blood pressure explains some of the intractable hemorrhagic cases at this time of life. I think the whole subject is open for further investigation. We have come only to the border lines of our knowledge of blood pressure changes and their proper interpretation.

Dr. Collin Foulkrod.—One of the pertinent reasons for this meeting is the fact that we still see patients with a systolic blood pressure of 220 and of 240. This ought not to be. If men who practice medicine would realize the importance of blood pressure in pregnancy they would not allow the pulse tension of their patients to rise to the point of danger and we would not see these patients in our hospitals. The question of blood pressure in pregnancy is of the utmost importance, every patient should be examined from this standpoint in order to make a standard for that individual. When the patient is not pregnant the obstetrician should be able to get a record of the pulse tension from her medical attendant before pregnancy. I have gone over a number of cases to find the average systolic pulse tension in women in different stages of pregnancy. Such women do not come to us in the first few months of pregnancy so that we may take their pulse tension, unless they are sick. As a result, my observations were taken in the last six months of gestation. In 33 per cent. the blood pressure was 130. Twenty per cent. showed a tension of 120 and in these no peculiar symptoms were manifest. When the pulse tension showed 110 in most instances, it was evident that there was something wrong with the patient. One fell to 99; this woman had a pre-existing heart lesion. If the blood pressure in a pregnant woman goes below 110 she should be carefully watched. I am convinced that such a fall of tension means either primary cardiac weakness or some inability on the part of the patient to stand the inroads of the developing syncytial cell. Dr. Norris has called attention to the fact that there is some relation between the ductless glands, pregnancy and pulse tension. We hear of the high pulse tension in the menopause, measuring 250, running so for several months and eventually coming to normal. There must be some interrelation of blood pressure and the ductless gland which we shall do well to study in relation to the pregnant woman. We have never been able to accept the pulse tension alone as of any more value than our other laboratory aids to diagnosis. It has been my experience also as Dr. Hirst has commented that some patients may have had a pre-existing high pulse tension. Such patients may have a tension of 200 systolic and over and not have convulsions, but they invariably take a longer time to return to normal and in many instances remain elevated.

Dr. E. P. Barnard.—In looking over the last 200 cases at the Retreat I find the blood pressure average 117. The lowest was 90, the highest 225. It is difficult to say just what is the normal pressure. I hold any case above 140 as abnormal. There were 18 in this class, ranging from 140 to 225, all showing different amounts of albumen. There were nine cases below 140 showing albumen, but none of these required any obstetrical treatment other than simple cathartics and restricted diet.

The treatment in the eighteen cases consisted in sweats, salines, milk diet, veratrum, blood letting, induction of labor, and rupture of membranes. Labor was induced eight times. The results of this line of treatment varied, generally speaking, the blood pressure was not reduced under forty-eight hours. Blood letting caused the most pronounced drop. Sweating was only temporary, likewise the delivery caused only a small immediate drop in the pressure.

A combination of all these methods in severe cases usually caused a decline of the pressure in forty-eight hours.

All eclamptics showed a marked elevation in pressure, except one which was 145 until after delivery. This case at no time showed the slightest trace of albumen.

In none of these cases was high blood pressure unassociated with other symptoms indicating a toxemia.

Dr. Daniel Longaker.—I rise, not to take issue with anything that has been said, but rather, to confirm what has been said upon the basis of hundreds of blood pressure estimates in gestation. I would point out what, to my mind, is the weakness of the entire subject as developed here to-night, and as we study it in the literature of the subject. It is the lack of study of the renal efficiency and of correlation of renal efficiency examinations with blood pressure. In this connection, there comes to my mind a patient who a few years ago, was under Dr. Hirst's care in the University Hospital, I think. At that time, her blood pressure was 200. Her gestation resulted in a dead and macerated baby, born at term. She subsequently passed through two similar experiences, losing her baby each time. Recently, this patient came under my observation, and, naturally, I was especially interested in the study of her blood pressure. At no time, did it go above 140; the systolic did not go above 140; the diastolic was 90. By the auscultatory method it is easy and simple to note diastolic, as well as systolic pressure. The weakness of the matter is our lack of knowledge of the renal efficiency as disclosed by the phthalein test. I am surprised that so little has been done in this direction. When I tested this woman's kidneys the first hour output was 15 per cent., the second, 8 per cent. The urinary findings were not significant. She passed a rather large amount of a rather low specific gravity. The patient went along nicely to the thirty-sixth week of gestation and then told me that the fetal movements were becoming feeble. Her Wassermann was entirely negative. With her consent, and appreciating the fact that there was behind this case, not a toxemia, but a nephritic condition that was endangering the life of the child, labor was induced. Her own life was not in danger because of the absence of ferments or the presence of syncytial cells. She gave birth to a small child but fairly well developed, weighing two ounces less than six pounds. It has done particularly well. Curiously enough, her renal condition, as evidenced by casts 12 days after delivery, was more pronounced than before. At the same time, in a remarkably gratifying manner her renal efficiency had improved; 25 per cent. elimination in the first hour, and 12 per cent. in the second.

To my mind, the reason why blood pressure in these cases does not fall promptly is because of the existence of chronic nephritis. Upon the persistence of a high blood pressure, we may base our prognosis: permanent damage to the kidney.

Dr. John A. McGlinn.—The majority of papers upon blood pressure in relation to toxemia of pregnancy claim that there is a limit of safety, variations above or below this limit indicates danger. This I believe is the belief among the profession at large, though apparently not held by the gentlemen who have spoken tonight. Unquestionably, blood-pressure examinations are very valuable adjuncts to diagnosis and prognosis of toxemias but we are not justified in making a diagnosis of toxemia of pregnancy and basing our treatment on blood-pressure findings alone. How can we say that a woman is toxic because she has a blood pressure of 160. She may have had this blood pressure before she became pregnant. I can only arrive at definite conclusions as to the severity of toxemia by the study of blood pressure in connection with other associated symptoms. High blood pressure alone does not mean toxemia of pregnancy any more than the mere presence of albumin of the urine means toxemia of pregnancy.

I am firmly convinced that blood-pressure studies should be made in every case of pregnancy. Blood-pressure readings should be taken at frequent intervals because it is only by such a study that we can find out whether or not there is a constant rise of pressure during this state. A constant rise in pressure during pregnancy is indicative of toxemia. While not decrying blood-pressure studies in pregnancies I take the stand that blood pressure is simply a valuable aid in our study of toxemias of pregnancy and we should not depend upon such findings alone but only in connection with a thorough study of the case.

Dr. William R. Nicholson.—There is one question I should like to ask: What is the meaning of a low blood pressure? I feel that after studying a case of high blood pressure I have some idea what to do, but I must confess that when a woman comes to me in the child-bearing age with a blood pressure of 90 or less, I am prone to send her post haste to some one of my friends, but never have I received any help in the problem. I should like to ask Dr. Riesman what his opinion is regarding low blood pressure without other demonstrable symptoms. I have never seen such a case give bad results during labor. Nevertheless, whenever I get a patient showing this low blood pressure it gives me anxiety.

Dr. George P. Müller.—I wish to thank the Society for their kind attention. In answer to Dr. Foulkrod I want to state that I spoke of wondering why this symposium had been decided upon, because ten years ago so much had been done, especially in this city, upon blood pressure. We have the work of Stanton, Norris, Faught, Nicholson, and Goodman. It must be because, as I said in my earlier remarks, the estimation of blood pressure is not in general use at the present time in our hospitals. It is a pity that such is so because there is no other practical way by which we can so accurately estimate the condition of the circulation. I did not hear the words laboratory diagnosis brought up tonight and it is time that we realized that the use of the blood-pressure instrument, the *x*-ray, or the serum test is not a laboratory diagnosis but is simply a better way of investigating a certain symptom or lesion than we have had in the past. Nothing equals the *x*-ray in the diagnosis of chronic gastrointestinal conditions. It is more valuable than the history but without the history is valueless.

Dr. Hirst (closing).—There are only two things I have to say. I would like some one to tell us—perhaps Dr. Riesman will—why the phenolsulphothalein test in the toxemias of pregnancy is so uncertain. We have used it in the University Maternity but the results are unsatisfactory. I see quite a number of women with low blood pressure. My private patients are ordered rest in bed and tincture of nux vomica and strophanthus.

Dr. David Riesman.—The two questions put to me I cannot answer. Dr. Hirst asks why the phenolsulphothalein test fails in pregnant women. Taking cases as they go, all these tests have some value like the HCL test in gastric carcinoma. The absence of HCL is a guide to us, so with the phenolsulphothalein test in pregnancy. The persistence of high tension after eclampsia is interesting, but I would not consider that a very remarkable thing. It has been pointed out by one of the speakers that these patients might have had a renal condition, or another cause of hypertension which would not disappear. If these patients are followed for a year it might be found that the cause of the hypertension was in part toxic and in part the underlying cause. It is the underlying cause that we ought to find out and we shall do so if we make blood-pressure estimates. Dr. McGlinn is quite right; the amount of the blood pressure is a symptom and must not be magnified into making the diagnosis. I am not convinced that the menopause, as such, is the cause of high blood pressure; but that there is some other very subtle cause. The cause may lie in the ductless glands or in some entirely latent renal condition. There is a large group of hypertension cases in which the kidneys are normal by every test and in which the retinal vessels show no change. Dr. Hirst and Dr. Longaker spoke of the diastolic and systolic measurement by the auscultatory method. This is the easiest way to get pressure. A very low diastolic pressure or one incapable of being taken is in favor of aortic insufficiency. A high diastolic pressure is very significant, but I do not think we can draw any hard and fast rules as to these matters. Regarding Dr. Nicholson's question as to low blood pressure, I think Dr. Hirst's idea is right. These women are usually thin and under weight; apt to tire, and have other signs of low vasomotor resistance. This condition is found much more often in the higher walks of life than among the poorer women, but it is also found in them if they are underfed and underslept. The best treatment is rest, particularly plenty of sleep and an abundance of food.

REVIEWS.

STUDENTS' MANUAL OF GYNECOLOGY. BY JOHN OSBORN POLAK, M. Sc., M. D., F. A. C. S. Professor of Obstetrics and Gynecology, Long Island College Hospital; Professor of Obstetrics in the Dartmouth Medical School, Etc. Fellow American Gynecological Society, New York Academy of Medicine, Etc. Illustrated with 100 engravings and 9 colored plates. Lea & Febiger, Philadelphia and New York. 1915.

Professor Polak's recently issued manual constitutes one of the most satisfactory works of this particular character in text-book literature. The pathology and symptomatology of various gynecological diseases as well as the accepted methods of treatment are presented in a very concise and easily assimilable form, theoretical discussions having been largely omitted in favor of statements of the essential and definite facts in diagnosis and treatment. A great many of the more commonly used gynecological operations are described in detail and satisfactorily illustrated. The salient features in the work are modified by being placed in italics. The book deserves the favorable attention of the profession as an excellent teaching manual.

THE MEDICAL PICKWICK. EDITED BY SAMUEL M. BRICKNER, M. D., Vol. 1, No. 1. Saranac Lake, N. Y. Issued Monthly. $2.00 per annum.

This is a new journal devoted to the humane and humorous side of the medical profession. It aims to consider medicine in a Pickwickian sense and is to be exclusively an organ of the literary and cultured side of the profession. The contents of the present number bear out very well the aims referred to and an interesting and readable lot of brief contributions by medical men, in the form of stories, poems, anecdotes, etc., is presented. There is no doubt that the effort to supply the profession with a publication of this kind will meet with success but we think if it was published in a more handy form the success would be more marked. The present rather large page might well be displaced by one of a small octavo, size.

CASE HISTORIES IN OBSTETRICS. BY ROBERT L. DENORMANDIE A. B., M. D. Assistant in Obstetrics, Harvard Medical School Etc. Boston, W. M. Leonard, 1914.

Methods of instruction by means of case histories have long been in vogue in law schools but it is only within comparatively recent years that this method has been applied to medicine in the form noted in the book here reviewed. Unconsciously didactic teaching in medicine has long made use of this method and probably every clinical lecturer in medicine has referred to his own experience in specific cases to illustrate the desired points of his lecture. R. C. Cabot and John Lovett Morse were the first to arrange a definite series of case histories for reference by medical students and since the publication of their works others have been added to the series, including the most recent one, that of Dr. DeNormandie on Obstetrics. The subject matter is presented in such a way, however, that the book also serves as an excellent medium for postgraduate teaching and will undoubtedly find its largest use in this respect. The author divides his work into sections each dealing with some aspect of pregnancy and the puerperium, beginning with the diagnosis and ending with the puerperal complications and the new-born baby. He also devotes a special chapter to scopolamin-morphin anesthesia. At the end of each section is presented a summary which contains a complete consideration of the subject set forth in the preceding cases. The book is written in colloquial fashion and very readable. Unfortunately there are no illustrations, for in a great many instances the teaching value of a case may be more firmly impressed by a graphic illustration of its salient features. This applies particularly to the various abnormalities of presentation and operative details. The book may be commended as an excellent presentation in the simple and explicit manner of the clinical features of the obstetric art.

HAND-BOOK OF OBSTETRICS. BY KEDARNATH DAS, M. D., Obstetrician and Gynecologist to the Campbell Hospital, Calcutta; Fellow, Member of the Faculty of Medicine, and Examiner in Midwifery, Calcutta University, Etc. With 376 Illustrations. Butterworth & Co. (India), Ltd. 1914.

In considering this work one marvels why its publication should have been undertaken in view of the numerous excellent obstetrical manuals in the English language. The writer claims, however, that there are certain difficulties for Indian students in acquiring a knowledge of the science and art of obstetrics and that among Indian women important and essential modifications in the management and treatment of confinements are necessary. Thus he refers to the fact that the average weight of new-born Indian children is about 19 per cent. less than that of Europeans and that the average size of the pelvis is proportionately smaller. The effects of a tropical climate during pregnancy are likewise manifested by certain symptoms, including a phosphaturia which the author believes is possibly induced by the lowered nervous tension on an enfeebled system leading to perverted metabolism and an excessive increase of phosphates.

As the work is intended for students of another race we can hardly permit ourselves any criticism of the same. However, it seems as if the author had attempted to crowd a great deal of material within a limited space and naturally, especially when the subject of treatment is discussed, this is hardly satisfactorily considered. He modifies this, however, by stating that only those procedures are considered which are within the resources of a general practitioner.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

The Serological Relations of Twins.—Schiff (*Berliner klin. Wochenschr.*, July 27, 1914) has made a careful study of unioval twins for the purpose of detecting any possible serological differences between them. These sera were tested with the red blood cells of eight normal individuals, all of which were controlled by suitable means. It was impossible to detect any difference in the behavior of the blood of the two infants although methods were employed which permitted the blood of all the other individuals examined to be differentiated.

An Early Sign of Pregnancy.—Labhardt (*Zentralbl. f. Gynäk.*, July, 18, 1914) describes a sign of early pregnancy which is marked by a livid streak extending across the region between the urethral opening and the edge of the hymen, and passes off on either side into the labia minora. He has found this in the majority of cases of pregnancy before the fifth or sixth week and claims that it is more evident in multipara than primipara, antedating in every case the general vaginal discoloration.

The Comparative Toxicity of the Urine, Serum and Milk during Pregnancy.—Werner and Kolisch (*Arch. f. Gynäk.*, Bd. ciii, Ht. 1) have investigated this subject with particular reference to eclampsia, using for the purpose a series of guinea-pigs. It appears that the urine and serum of normal nonpregnant individuals is nontoxic. The urine of healthy pregnant women is toxic, which diminishes during labor, increases in the puerperium and reaches its maximum point on the third and fourth day of labor. In nephritis the toxicity of the urine is increased. In eclampsia this is reduced during labor, increased immediately after but is not at any time higher than that of normal women in the same period of pregnancy. The serum of healthy gravid individuals in contrast to those not pregnant, is toxic but this diminishes during labor and increases again in the puerperium, reaching its maximum on the third day. In nephritis the toxicity of the serum is increased. The serum of eclamptic subjects before labor is toxic if edema is absent but is apparently not toxic when edema is present. The serum of eclamptics during the puerperium is usually only toxic when edema is present. Colostrum is only toxic to a slight degree, the maximum being reached on the third day. The milk of nephritic women does not show any increase in toxicity beyond that of normal subjects. The same relation appears to exist in the milk of eclamptic women and no increase in the toxicity of the colostrum during eclampsia could be established. Although the edema fluid of nephritics is toxic, this is not so in the presence of eclampsia, although this fluid from eclamptic women is toxic. The toxicity of the edema fluid appears to stand in reverse relation to that of the serum. The poison which appears during pregnancy in the urine, serum and milk, possesses neither antigens nor antiphlactic properties. The results which have been obtained by biological methods with the urine, serum and milk of eclamptic women do not appear to stand in any relation with the clinical picture of the urinary findings in eclampsia. Symptom complexes which have hitherto been regarded as characteristic for anaphylaxis may also be found in pericardial hemorrhages. In order to avoid errors it is absolutely necessary that all experimental animals be killed by chloroform as soon as possible and then autopsied.

The Course of Labor in Contracted Pelves.—Nebesky (*Arch. f. Gynäk.*, Bd. ciii, Hft. 3) has studied the course of labor in narrow pelves in the cases delivered in the Innsbruck Clinic during the last fifteen years with particular reference to Cesarean section. During this time 15,998 women were confined, among which were 1673 cases of contracted pelves, or about 10.5 per cent. Leaving out of consideration seventeen cases of miscarriage, there were 1302 (78.1 per cent.) spontaneous labors; whereas, operative delivery was necessary in 365 cases (21.9 per cent.). There were five maternal deaths including two from sepsis, one each from pneumonia, cerebral hemorrhage and myocarditis. Fever during the puerperium was present in seventy-two cases, including seven in which actue illness resulted. In sixty-five cases (3.9 per cent.) the fever was due to genital causes, including 3.2 per cent. of spontaneous and 6.3 per cent. of operative deliveries. In the latter class there were seven cases in which fever was present before labor. In the author's series there were 1667 viable children not including the miscarriages, of these 1443 were discharged alive and well. The total fetal mortality amounted to 224 cases (13.43 per cent.) Among these 4.98 per cent. were born spontaneously and 8.45 per cent. after an operative delivery. The total mortality in the first group was 6.3 per cent. and in the latter 38.6 per cent. After excluding fifty-nine cases in which the fetal death had nothing to do with the labor, the fetal mortality is reduced to 165 cases or 10.2 per cent. in which the cause may be laid to the narrow pelvis. Nebesky believes that as the result of their experience an effort should be made to induce labor in the vertex presentations. If the degree of pelvic contraction permits of the birth of a fully developed child this is easiest in vertex presentations. The fetal mortality in breech presentations, where this occurs spontaneously or is the result of a version, is approximately ten times as great as in vertex presentations. He does not consider prophylactic version desirable and in the presence of transverse presentations advises external cephalic version. Where the cord has prolapsed replacement should always first be attempted. In primiparæ and where the pelvic contraction is of a minor degree, an expectant course is desirable. If the history of previous labors or the relative dimensions of the pelvis and fetal head point to the impossibility of a spontaneous delivery, Cesarean section constitutes the most favorable method, both for the mother and the child. It must be done, however, as soon as the pains begin and before the aseptic character of the case has been interfered with. The operation may even be done before labor has begun and in such cases Nebesky believes that the transperitoneal incision through the lower uterine segment is to be preferred. If the case is no longer clean the Cesarean section should not be modified but the child sacrificed in the interests of the mother. A trial attempt with the high forceps may in certain cases avoid perforation. If the patient refuses operation, the induction of premature labor is indicated. Spontaneous deliveries with children weighing from 2000 to 2500 grams., affords the infant an excellent chance and the method must be regarded as a logical one. It is necessary, however, to conduct the same like a normal labor with the vertex presenting. The possibility of infecting the mother and the frequently atypical course of premature labor after its induction exposes the life of the child to a marked degree.

Tuberculosis of the Genitals in Girls.—Graefe (*Monatschr. f. Geburtsh. u. Gynäk.*, Bd. xl, Hft. 5) presents a careful study of nineteen cases from Simond's pathological laboratory in Hamburg from which, in connection with the literature, he presents the following conclusions. Genital tuberculosis in female children in contrast to the frequency of general tuberculosis may be regarded as relatively infrequent and even less so than in adult women. It is most often found between the first and fifth and again between the tenth and fifteenth years. This type of infection is usually associated with older tuberculous processes in other parts of the body. It is transmitted through the medium of the circulation, and as in adults, the favored site is in the abdominal portion of the tube and in the uterus, whereas, the ovaries, vagina and vulva are but rarely involved. The process usually begins from the mucous surfaces and penetrates gradually into the deeper tissues where' it results in caseation. The obliteration of the process by the growth of connective tissue rarely occurs. The disease usually is disseminated from the tubes to the remaining portions of the genital tract, although these may be independently infected through the circulation. The transmission of the process from the tubes to the peritoneum is much more frequent than the reverse and it is extremely rare to find a primary lesion in the vagina or vulva or an extension of a renal tuberculosis to the genitals.

The Influence of Menstruation on the Hemolysis of Vaginal Bacteria.—Hellmuth (*Monatschr. f. Geburtsch. u. Gynäk.*, Bd. xl, Hft. 5) as the result of careful bacterial examinations finds that the menstrual process does not ordinarily result in an hemolysis of the vaginal bacteria. Even in the presence of a metrorrhagia extending over many weeks in two cases under observation, no hemolytic organisms could be demonstrated in the vagina. If such organisms are present during menstruation they have not been converted from hemolytic bacteria under the influence of this process but have been introduced from without by invasion or inoculation. In the presence of pathological conditions such as inflammatory changes or prolapse, the presence of hemolytic organisms is possible. Whether continued bleeding such as is associated with myomata will result in this phenomenon is not as yet determined, although the author's investigations seem to show that in no case does this occur with any degree of regularity or frequency as it would if the hemolysis of the organisms, and especially that of the streptococcus occurred as a result of the presence of blood in the culture medium.

Ligation of the Vena Cava in Puerperal Pyemia.—Fromme (*Zeitschr. f. Geburtsh. u. Gynäk.*, Bd. lxxvi, Hft. 2) reports a case of pyemia following abortion in which ligation of the vein was undertaken as a last resort. After opening the abdominal cavity a complete thrombosis of the right common iliac vein was found which extended into the vena cava about 2 cm. The left common iliac was not involved. With the idea of excluding the thrombus from the circulation, the vena cava was tied off about three finger breadths above the bifurcation. The temperature subsided, but ten days later again rose accompanied by severe chills. The patient died three weeks later. Autopsy showed that the simple ligation of the vena cava in this case was not sufficient to prevent the infectious process extending from the right to the left common iliac vein below the point of ligation. From this point an embolus was carried to the heart. The author believes that in similar cases in addition to ligating the vena cava, an additional ligature should be placed on the healthy common iliac just in advance of the point in which it enters the vena cava.

The Nerves of the Ovary with Particular Reference to the Interstitial Gland.—Wallart (*Zeitschr. f. Geburtsh. u. Gynäk.*, Bd. lxxvi, Hft. 2) presents an extended study conducted on human ovaries obtained at operation as well as on those from rabbits, guinea-pigs, cats, dogs and cattle. The author calls attention to the following points: The entrance of the nerves into the ovary occurs at the hilus between the vessels. From this point the larger number of the nerve bundles find their way to the cortex after giving off numerous branches to the vessels and muscles, whereas isolated nerve tracks do not give off any branches and do not diminish in size. In the cortex a thick plexus of fibers are found, some of which are provided with medullary substance and others are free from the same. The ovarian vessels are more plentifully supplied with nerves than is the case in any other parenchymatous organ and the musculature is equally well provided for. Neither in the human subject nor in the animals was it possible to demonstrate a penetration of the nerves between the cells and the glandular layer to the follicles. The corpus luteum at the time of its maximum development is poorly supplied with nerves but during the stage of retrogression is, on the contrary, very freely supplied. The interstitial gland in the human subject, as well as in many animals, shows a remarkable large number of nerve plexuses at all times, from which it may be concluded that the interstitial gland of the ovary is present as a factor in the organism which brings about a close relation between the ovary, both through nervous and organic relations to the remaining organs. At the same time no definite conclusions can be drawn as to the nerve endings in the ovary but it is very probable that most of the nerve fibers are terminated in the stroma with the development of any particular end organ. Along the tracks of the nerve bundles and fibers of the ovary many similar structures are included which closely resemble ganglion cells. Although these structures may be true ganglion cells, no definite proof can be produced for this assumption.

Local Anesthesia for Vaginal Operations.—Ruge (*München. med. Wochenschr.*, December 22, 1914) reports his experiences in a series of 22 cases in which a solution of novocain (1 to 2 per cent.) with 5 drops of a one pro mille suprarenin was injected into the parametric tissue. He employed a long needle which entered the lateral fornices, being directed somewhat to the ouside. The anesthetic effect comes on usually in from 20 to 25 minutes, involving in order the vaginal vault, the base of the bladder, the adnexa, the body of the uterus and a portion of the rectum. The vulva outlet with the clitoris and the anus does not appear to become involved. The anesthetic effect may last as long as an hour. Ruge has thus far done vaginal hysterectomies for carcinoma or total prolapse, chronic metritis, interstitial myoma, perforated uterus and vaginal fixation. In 21 out of 22 cases thus operated upon the anesthesia was sufficiently complete and in 14 cases absolute. In a few instances certain movements caused pain. The author has not found any bad effects from the procedure. He did not employ the method where inflammatory exudates were present. The method seems particularly indicated in poorly nourished, hectic and anemic individuals.

The Diagnosis and Prognosis of Kidney Changes in Pregnancy. Wolff and Zade (*Monatschr. f. Geburtsh. u. Gynäk.*, vol. xl, No. 6, December, 1914) presents a study of the clinical material during the past five years at the Heidelberg clinic, including only those cases in which the renal changes led to well-marked clinical disturbances. including large amount of albumin, edema, vomiting, headaches, dyspnea, visual disturbances and eclampsia. They find that the individual forms of renal disturbances in pregnancy cannot be differentiated by the clinical signs known at the present time. A chronic nephritis may result from the so-called kidney of pregnancy during the puerperium or later, and there is a predisposition in such patients to a recurrence in future pregnancies. Albuminuric retinitis may be associated with the ordinary kidney of pregnancy and eclampsia in the presence of a chronic nephritis. During pregnancy the appearance of an albuminuric retinitis is not associated with the bad prognosis which is present during the nonpregnant state. This type of retinitis may disappear completely after labor.

Transplantation of the Ovaries.—Colombino (*Gynäk. Rundschau*, vol. viii, No. 23) reports a case of autoplastic ovarian transplantation which he was able to observe for a considerable period. The patient, twenty-five years of age, was subjected to a double salpingotomy after an attack of puerperal infection a year previously. At the same time an ovary from another woman was implanted in the subcutaneous fatty tissue of the right inguinal region. About six months later a vaginal hysterectomy was done on account of the incessant hemorrhage. The patient at this time complained of continuous pain in the right inguinal region and also stated that she had regular attacks of painful swelling in this locality approximately every four weeks which lasted several days. A cystic tumor was diagnosed and evacuated by puncture. The sensitiveness increased and about a year later it was necessary to remove the implanted ovary. Subsequently the usual symptoms of a premature menopause appeared. A careful examination of the ovary showed extreme tissue changes. About three-fourths of the organ was cystic, although well-marked remnants of corpora lutea were present. The remaining portion was made up of connective tissue and no Graafian follicles in any stage were evident. It appears therefore that a complete degeneration of the parenchyma of the ovary occurs in such transplanted organs.

The Cause of Ovarian Hemorrhage.—Cantoni (*Arch. f. Gynäk.*) Bd. ciii, Hft. 3) has attempted to solve this problem from a microscopical examination of nine cases as the result of which he concurs with the findings of other authors in the statement that it is impossible to determine a counter-basis for the various types of ovarian hemorrhage. He shows that the most careful histological examination fails to demonstrate anything more than the site from which this occurred. The normal histological structure of the ovaries, especially as regards the development and the rupture of the follicles presents many difficulties in the study of these processes; for the tissues are either entirely destroyed or show damage by the hemorrhage and the finer structural relations are entirely obliterated. Any damage which results in ovarian hemorrhage undoubtedly involves the vascular system of the entire ovary or a greater portion of the same. This physiological hyperemia constitutes the most frequent cause for ovarian hemorrhage and the formation of tumors, inflammations and changes in position of the female sexual organs which occur in a relatively contracted space readily interfere with the circulatory conditions of these vascular organs.

Covering Adnexal Stumps.—Thomson (*Zentralbl. f. Gynäk.*, 1914, No. 52) suggests the following method for covering the stump after the removal of tubes or ovaries, which at the same time serves to support the uterus. He called attention to the importance of avoiding intestinal adhesions to such stumps and refers to one of his own cases in which intestinal obstruction occurred from this cause. His procedure is as follows: After removing the adnexal tumor by a laparotomy with the patient in the Trendelenburg position, the uterus is freed from adhesions and brought forward. The round ligament on the side where the removal took place is seized at a point about 3 cm. from its insertion into the uterus with a clamp and drawn around to the posterior surface of the uterus. In this manner the raw surface on the broad ligament is covered with peritoneum. The round ligament is then fastened with a few stitches to the posterior surface of the uterus and if the raw surfaces are not entirely covered a few additional sutures may be introduced. Where a removal of the adnexa on the other side has been undertaken, a similar procedure may be followed. The author bases his recommendation on the good results obtained from Baldy's operation in which retroversion of the uterus is corrected by attaching the round ligament in this manner.

GYNECOLOGY AND ABDOMINAL SURGERY

Difficulty of Diagnosis of Primary Carcinoma of the Tube.—Esther Tehornaia (*Ann. di ostet. e gin.*, Oct. 31, 1914) states that primary tumors of the tubes are rare and can be with difficulty differentiated. The author cites a case of tubo-ovarian cyst, formed by the adhesion of the abdominal end of the Fallopian tube to the substance of the ovary. Here it is very difficult to say whether the tumor was primary in the tube or the ovary. The development of carcinoma of the ovary is rapid while that of the tube is slow. If the extent of carcinomatous tissue is slight it is in favor of the tube as original tumor tissue. Carcinoma of a tube begins in the ampulla or the middle of the tube. If ascites is absent the tumor is in the tube. The author's case showed a slow advance, with slight development of the tumor, a papillary structure, neoplastic masses in the ampulla, no ascites, and it was evident that it had been preceeded by inflammatory symptoms. All these facts go to show that it was a primary carcinoma of the tube. Only by the location and connections of such a tumor can we differentiate between one of the ovary and of the tube.

Therapy of Cancer by the Method of Alexis Carrel.—F. Maccabuoni (*Ann. di ostet. e gin.*, Oct. 31, 1914) recalls that Carrel cultivated different kinds of tissue cells in plasma in vitro, and was able to restrain liquifaction until the cells had shown multiplication. The author cultivated human cancer in the plasma of pregnant women and delayed the liquefaction for eight days, a marked development of cells occurring. Three developed bodies that showed a central nucleus, a nuclear membrane and a clear and abundant cell plasm, similar to epithelial cells. The author believed them to be epithelial cells. Probably at the same time antitoxins are developed in the medium. In a carcinoma these same antitoxic bodies are developed but are at once carried away by the blood current. If we could inject these products in large amount into the growth we might get their effects, before the circulation could carry them away. The author produced these antitoxic bodies from the cancer in six patients, and then injected them into the growth, hoping to get curative effects; but the treatment gave no good results. Further experiments in this direction might have better results.

Relations of Anatomical Alterations of the Ovaries and Essential Metrorrhagia.—G. Aymerich (*Ann. di ostet e gin.*, Oct. 31, 1914) has made a study of the possible relations of essential metrorrhagia with anatomical changes in the ovaries. He finds that there is no such relation between degeneration of the ovaries and metrorrhagia. Metrorrhagia may occur without degeneration or vice versa. Histologically the action of the corpus luteum and the interstitial cells occurs in both cases, with or without metrorrhagia. Since there is disappearance of metrorrhagia in some cases after the removal of ovaries when diseased, we must admit as the causative factor an internal secretion of the ovary, although this cannot be demonstrated histologically. Therefore we must admit that the ovarian secretion enters as a factor into the production of essential metrorrhagia.

Cancer of the Breast.—W. S. Handley (*Surg. Gyn., and Obst.*, 1915, xx, 72) has found in microscopic sections of long centrifugal strips of the skin and subcutaneous tissues, radiating from the primary growth, at points near the growth, isolated nodules of secondary growth. Farther out at a varying distance up to ten inches from the primary growth, is a narrow and elusive zone a few millimeters wide where the lymphatic vessels are choked by cancer cells. Beyond it the tissues are normal. This zone constitutes the true growing edge of breast cancer. It may be found at any distance up to two feet from the primary growth. The detection of this microscopic growing edge is the foundation stone of the permeation theory of dissemination. These facts can be explained only as follows: The immense proliferative pressure of the epithelium at the primary focus forces cancer cells into the small lymphatics, along which they grow in continuous lines. This process, which the writer calls permeation, is the master-process of dissemination. Reaching the lymphatic plexus into which the breast in the first instance drains, permeation involves a larger and larger circular area of this plexus, filling up its channels with lines of cancer cells and sending offshoots into the adjoining muscular and cutaneous layers. Sooner or later cancer cells are thus brought into the serous cavities and rapid visceral dissemination rings down the curtain. The main operative principles deduced from the permeation theory are: First, the area which demands widest removal is that in which the growing edge is situated, namely, the deep fascia, in which is found the lymphatic plexus which forms the highway for the spread of the disease. Second, the area of deep fascia removed must be roughly circular in outline, since permeation spreads with approximate equality in all directions from the primary growth. Third, the primary growth must always be the center of the area of fascia removed. Failure to observe this rule accounts for many recurrences. Fourth, the skin and muscles being secondarily involved over a smaller area, and less widely than the fascia, the removal of a smaller area of these tissues will suffice. The removal of the embolically invaded regional lymphatic glands is, of course, essential.

Filiform Appendices.—By a filiform appendix is meant one having a diameter of two millimeters or less while the length may be that of the ordinary appendix. Filiform appendices are slender white cords usually covered in part or all of their extent by the fold of Treves, or that of Jonnesco and Juvara, or what is commonly called a pericolonic membrane. In the past year H. K. Boner (*Surg., Gyn. and Obst.*, 1915, xx, 78) has collected seven specimens of filiform appendices. Five of these appendices were completely covered by the fold. The principal types of filiform appendix are: First, the appendix in which the proximal inch is of normal size and free, while the remaining part is enveloped by a pericolonic membrane. Second, the appendix in which the tip has been caught on the mural peritoneum, resulting in the drawing out of the organ into a slender strand. Third, the appendix in which the proximal three-quarters of an inch is definitely constricted by the pericolonic membrane, while the remainder is free. Fourth, the appendix which is completely covered by the pericolonic membrane. Fifth, the appendix in which the tip is covered by a membrane. Filiform appendices are almost always found beneath a membrane and, therefore, one naturally assumes that a causative agent in the production of filiform appendices must be constriction by a pericolonic membrane to quite some extent. The exception to this etiology of a filiform appendix is the type already described, in which the appendix has been caught on the mural peritoneum, and possibly the type which is found in a retrocecal position in only partially descended ceci. The gross appearance of the typical filiform appendix is that of a slender white cord having a cross diameter of two millimeters or less, the length varying from three to seven centimeters. There are probably two processes associated in the production of filiform appendix; namely, a chronic inflammation and an involution due to the constriction by the accompanying pericolonic membrane.

Transplantation of Ovaries.—T. Tuffier (*Surg., Gyn. and Obst.*, 1915, xx, 30) has performed 204 ovarian transplantations, thirty-five of which he excludes from consideration because done recently. Homografting he has performed twenty-four times, but it did not prove successful. He has performed seven heterograftings immediately after the removal of an ovary or after the gland had been preserved in cold storage from one hour to forty-four days, and the operation has never given a single functional result. Autografting, the process of grafting a woman's ovary in her own body, he has performed 145 times. After the transplantation, where the uterus is left in place, the ovary remains unaltered for three or four months and seems to lie dormant. Sometimes it is a little tender, and the patient has all the symptoms of change of life. But after a while the ovary becomes active, enlarges, and is sometimes painful for five or six days, whereupon all symptoms subside and menstruation reappears. Generally the congestion of the ovary precedes menstruation by five or ten days. On the same day when menstruation has commenced all the symptoms of menopause disappear entirely. After a month or so ovulation again takes place. It is certain that with the grafting of an ovary the normal condition of the patient can be maintained. If menstruation does not appear, the patient exhibits signs and symptoms of the menopause. The real cause of the symptoms lies in the suppression of menstruation, the proof of which is the fact that as soon as the patients have a return of the monthly period, all the symptoms of change of life disappear. Moreover, if the flow stops for one month then the above-mentioned troubles come back. From these facts Tuffier deduces the following theory of menstruation: Every month the female creates, by internal secretion, a chemical substance; when this substance exists in the blood in sufficient quantity it acts on the ovary, which modifies it, and menstruation is consequently produced by this modified internal secretion and the secretion is eliminated with the flow. This chemical substance exists in the blood serum, because menstruation can be produced by injecting defibrinated blood. Must one do a transplantation in every case of salpingitis? All recent cases and all malignant diseases contraindicate the procedure. After the fortieth year it is also unnecessary. Another local contraindication exists in cases where strong adhesions are present between the ovaries and pelvis. Improvement in heterografting is the most desirable advance at present. Where the uterus is absent, ovarian transplantation is of no value.

Effects of Collargol as Employed in Pyelography.—By experimental work in dogs, D. N. Eisendrath (*Jour. A. M. A.*, 1915, lxiv, 128) shows that collargol will not injure either the healthy or diseased kidney if care be taken not to inject more than the renal pelvix can hold. If this limit is exceeded, or the fluid injected with too much force, serious results may follow, such as (*a*) larger (infarcts) or smaller deposits in the kidney and perirenal or perinephritic tissue; (*b*) infarcts or deposits or hemorrhages into the spleen and liver, and (*c*) various lung changes, such as embolic plugging of the vessels, hemorrhagic infarcts, acute pulmonary edema or pneumonia.

Atropin Treatment of Dysmenorrhea.—The atropin treatment of spasmodic dysmenorrhea has given E. Novak (*Jour. A.M. A.*, 1915, xx., 120) encouraging results in about thirty cases. The plan has been to commence the administration of the drug about two days before menstruation is expected to appear, and to continue its use until the second or third day of menstruation, depending on the usual duration of the pain. Ordinarily, about $\frac{1}{100}$ grain is given three times a day, unless some pain appears, in which event, if there are no symptoms of atropin saturation, the doses may be given somewhat more frequently. Many patients complain of dryness of the throat, itching of the skin, and sometimes even disturbed accommodation, in which case it may be necessary to lessen the dosage somewhat. When it is desired to study the effect of the atropin on dysmenorrhea, it is best to administer it alone, as in tablet form. In some cases it may be combined with various other analgesic drugs, such as aspirin. It would be illogical to expect good results from the administration of atropin in cases of dysmenorrhea associated with definite pathologic lesions in the uterus or adnexa.

Damage Done by Pyelography.—From experiments on dogs, E. L. Keyes and H. Mohan (*Amer. Jour. Med. Sci.*, 1915, cxlix, 30) conclude that momentary gentle distention of the normal pelvis of the kidney causes no more damage than a congestion of the organ, which congestion is doubtless of brief duration. But if the distention persists for a few minutes the injected fluid is absorbed into the blood vessels and lymph spaces about the kidney pelvis. Although the writers have been unable to detect any collargal forced into the collecting tubules, they have found it in the glomeruli and in the convoluted tubules. But inasmuch as there was much less collargol within the glomeruli and tubules than in the lymph spaces and vessels, they conclude that the appearance of collargol within the glomeruli and tubules is a secretory phenomenon. In actual practice we have to consider a secondary infiltration due to renal retention following the examination. This is of far greater importance than the primary retention at the time of injection. Secondary retention is the cause of most of the deaths from pyelography that have been reported. The cause of infiltration in these cases is ureteral obstruction. Hence it may occur when there has been no primary distention. Alarming symptoms following pyelography are to be relieved by immediate drainage of the kidney or nephrectomy.

The presence of collargol in the kidney parenchyma, as shown by radiograph or by operation, should not be a cause of apprehension, though it shows that the injection has been made with too much force. The collargol may enter the general circulation and be distributed to the other kidney and elsewhere, in some instances at least, and yet no great harm result.

Independence between Development of Placenta and Embryo.— L. Sencert and M. Aron (*Rev. de gyn.*, July 1, 1914) give the history and microscopical examination of the specimen obtained from a case of ovarian pregnancy. The embryo had disappeared at the time of operation, but there remained in the ovary a structure representing the placenta and having an umbilical cord, with veins and an artery in it. The patient became pregnant immediately after marriage, but instead of a birth there was a cessation of symptoms of pregnancy coincident with the appearance of pains in the ovarian region of one side. The pain and disability existed for two years, ending finally in an operation for a small ovarian tumor. When the specimen was examined it revealed that there had been an ovarian pregnancy. No trace of the embryo was left, but the remains of the placenta were incorporated with the ovary. Ovarian pregnancies reported in literature are extremely few. A minute examination of the specimen is necessary to establish the diagnosis, and we must demonstrate the absence of the corresponding ovary, the union of the fetal sac with the uterus by the ovarian ligament, the presence of ovarian tissue in the walls of the fetal sac, and the independence of the tube from the formation of the fetal sac. All these conditions were satisfied in this specimen, except the first, and here we have a part of the ovary remaining. The remains of the placenta showed it to belong to the primordial avillous period of the placenta. It was an undivided protoplasmic mass, with many nodules, and blood spaces. The author supposes that the fetus died at an early period of pregnancy and that it was absorbed. Either the embryo did not develop because the villi were not formed, or death caused the regression of the placenta and the villi were lost. During the two years during which the painful phenomena existed the uterus and ovary on the other side became atrophied, but after the operation they again enlarged and the patient again became pregnant. Probably a layer of glandular cells situated around the insertion of the placenta were the cause of the amenorrhea and uterine atrophy that were observed, acting as a gland of internal secretion.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATION.

THE ENERGY REQUIREMENT OF THE NEW-BORN.*

BY

HAROLD C. BAILEY M. D., AND JOHN R. MURLIN, PH. D.

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(With three charts and one illustration.)

IT is generally accepted that maternal nursing provides the ideal food for the infant. However, the breast secretion is not present in any considerable amount until after the third day. Should the new-born infant receive food in addition to the breast feeding during the first few days? Any attempt to answer the question on rational grounds should take account of the nature of the breast secretion, the possibility of preventing loss of weight, or at least reducing it, and the energy requirement of the child during this time.

A. *Value of the Breast Secretion during the First Week.*—Breast development is at its height early in pregnancy during the time when the corpus luteum attains its maximum development, that is, during the formation of the placenta. Colostrum may be expressed after the second month and there is occasionally a very considerable amount of this secretion in the early months of pregnancy. One of us has seen recently one woman in the sixth month and one in the eighth month annoyed by the quantity of thin milk running from the breasts. Not infrequently women have milk in their breasts on the first day of the puerperium, but the majority have but a small quantity of colostrum, estimated at 20 c.c. on the first day, an increasing amount on the second and third days, with the milk secretion itself appearing on the fourth day.

It has been thought that the child sucking the breast mechanically

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† This work was begun on the service of Dr. Edgar and through the kindness of Dr. Austin Flint, Jr., was continued for three weeks on his service.

empties it of colostrum and thereby stimulates it to secrete. But the appearance of milk is probably subject to some hormone(1) action and apparently it is independent of nursing, for we frequently see it in women with eclampsia who are not allowed to nurse their babies. On the third or fourth days their breasts fill up to the same extent as those that are being suckled. There are perhaps better reasons than this for permitting the child to feed on the colostrum. Ehrlich has suggested that in some cases immunity may be carried to the young in the milk, and Famulener(2) has definitely shown that hemolysins, and therefore probably bacteriolysins, may be transmitted by the colostrum. However, in this discussion, interest centers around the food value of the colostrum.

Camerer and Soldner's analyses of the breast secretion made at various periods, are as follows:

TABLE I.

Period	Nitrogen	Fat	Milk sug.	Ash	Dry-sub.	Prot.
Early colostrum 26–51 hours	0.928	4.08	4.09	0.48	16.04	5.80
Late colostrum 55–61 hours	0.508	3.92	5.48	0.41	11.12	3.17
Changing to milk 5–6 days	0.327	2.89	5.75	0.34	11.69	2.04
Early milk 8–9 days	0.247	2.45	6.75	0.24	12.21	1.54

From this table it may be seen that the food value of the colostrum weight for weight is greater than that of the milk itself, largely, of course, because of its greater concentration. Langstein, Rott and Edelstein(3) have recently published analyses of a large number of samples of the breast secretion taken from the first to tenth days of the puerperium. They obtained milk from eight different cases and found that the cases fell into two groups according as the early secretion was thick, yellow and viscous having a high heat value (1200–1500 calories per liter) or thin and white having a low heat value (600 to 800 calories per liter). Average values, they are inclined to think, may run about as follows:

1st day	1500 calories per liter
2nd day	1100 calories per liter
3rd day	800 calories per liter
4th day	750 calories per liter
5th day	700 calories per liter
6th day	675 calories per liter
7th day	650 calories per liter

Mr. Frank Gephart, of the Sage Institute of Pathology, associated with the Department of Physiology, has kindly made for us analyses of five samples of colostrum taken from the breast on the second and third days. The calorimetric heat value was obtained by burning in the bomb calorimeter. The protein and fat were directly determined, but the sugar was estimated by subtracting the values for the protein and fat from the bomb caloric values. In the table is included also an analysis of the top milk formula that was used in feeding the new-borns (see page 530).

COLOSTRUM.

TABLE II.

	In 100 c.c.			Heat value of 100 c.c.	
Day	Protein	Fat	Carbohydrate	Bomb cal.	Physiol. heat value cal.
	grams	grams	grams		
2nd day	2.56	2.60	7.75	66.73	62.6
2nd day	2.63	3.47	5.37	68.5	64.3
3rd day	1.79	1.25	8.68	56.06	53.24
3rd day	2.06	5.45	7.04	90.3	86.95
3rd day	2.63	2.06	7.44	63.6	59.4
Average	2.3	2.9	7.1	67.7	65.3
Formula	0.97	5.95	8.94	78.16	68.7

The average for the five analyses gives a physiological (*i.e.*, the utilizable) heat value of 650 calories per liter for the second and third day colostrum. This happens to be the same number of calories as given by Rubner and Heubner(4) for the breast milk, somewhat less than the estimations made from the analyses of breast milk by O. and W. Heubner(5) (800 to 888 calories per liter) and very much lower than the figure given by Langstein, Rott and Edelstein. Compared with the analyses of Camerer and Soldner the average figures are very close to their values for the fifth and sixth days. The samples here reported for the third day were taken from three different subjects. It is evident that all of them fall into Group II of Langstein, Rott and Edelstein. Whichever value prevails in any given case the utilizable heat value of colostrum therefore places this substance high as a food and possibly higher than the breast milk when secretion is fully established. It is the ideal food for the new-born, but the trouble is there is so little of it. It has been noticed on this service that it was impossible to obtain more than 1 or 2 c.c. of colostrum at any one time on the first day.

Von Reuss(6) gives a table containing the results of fifteen authors on the estimation of the amount of breast secretion made in all cases by determining the daily amount by weight gained during nursings. The amounts given by the three authors having the largest number of cases to average are tabulated below.

TABLE III.

Name	No. of cases	Days							
		1	2	3	4	5	6	7	8
		grams per diem							
Jaschke, 1909.......	18	19	90	193	260	339	402	415	470
Opitz, 1911.........	75	56	197	296	371	431	462	455	485
v. Reuss, 1914.......	25	....	54	173	263	327	254	362	390

Where the colostrum is thin and watery at the start it is evident from this table that it is not until the fifth day that an energy supply of 200 calories can be counted upon.

B. *Loss in Weight of the New-born.*—That new-born children lose weight for some days after birth is recognized to be the general rule. Among the causes of this certainly are the passage of meconium, urine, and at times allantoic fluid regurgitated from the stomach. Unless food is administered there is, of course, loss of organic materials which furnish energy by combustion. But most important of all is the loss of water. Birk and Edelstein (7) examined a new-born in a Voit-Pettenkoffer apparatus determining the carbon dioxide elimination and the water loss. They found the amount of water lost from the child's body was 28.12 grams per kilogram for the first twelve hours and 40.74 and 53.6 grams respectively for the next two twenty-four hour periods. They draw the conclusion that the loss in weight the first few days of life is due chiefly to the loss of water through the skin and lungs. Lust(8) found a greater amount of dry substance in the blood in the first week than subsequently and believes that in the new-born there is a close relationship between the body weight and the concentration of the blood; and that the curve of the water concentration therefore gives the picture of the amount of water in the body. Roth(9) by the refraction method found also that the water concentration in the blood ran parallel with the weight curve; while Von Reuss(10) applying these facts to actual practice gave a very considerable amount of water from the second day on, and in some cases obtained a return to birth weight as early as the seventh day. A part of the water loss apparently, however, is permanent and cannot be made up by administration of water. The reason for this will be readily understood when we remember that the child has passed from a water medium to an atmospheric medium. Immediately after birth the skin is turgid with water absorbed from the allantoic fluid; twenty-four hours later it begins to assume a normal appearance (V. Reuss, *loc. cit.*, p. 4).

Different authors give different amounts as the normal, or physiological, weight loss. Pies (11) who is one of the latest investigators gives the average loss for 108 infants of primiparæ at 300 grams the first week, or 9 per cent. of the birth weight. The average loss in weight the first week for forty-two infants of multiparæ, according to the same authority, was 270 grams, or 8 per cent. of the birth weight. All of these infants were fed five times in the twenty-four hours after the first day. Sadoffsky(12) by feeding the new-born infants twelve times in the first day and at two-hour intervals in daytime and four-hour intervals at night later was able to keep the initial weight loss down to 188 grams or 5.69 per cent. of the original weight. Benestad(13) has recently reviewed the entire literature bearing on the initial loss of weight and has cited various attempts made by Altherr, Krüger, Ingerslav and others to prevent this loss by placing the new-born to the breast of mothers whose babies had been born several days previously. Strangely enough in most of the cases the loss of weight instead of being corrected was aggravated. Benestad cites his own experience to the same effect and concludes that the cause is found in the inability of the alimentary organs to perform their proper functions immediately. Exceptions to the rule are, in his experience, those children which are the most robust at birth.

So far as the writers have been able to find there is no suggestion in the literature of feeding infants regularly during the first three days a milk mixture similar to colostrum. In August, 1912, on account of the decided loss in weight of a large number of the new-born infants such a proceeding was instituted on the Bellevue service. The breast milk was not discontinued, but after ten minutes of nursing the child was allowed to take all he would of a formula milk (composition given in the table, page 528). At the beginning of these observations the fat was not so high as given in the table but otherwise the formula has been constant. In only one case out of a large number fed in this way did any adverse symptom arise, and in this single case the administration of an enema relieved the condition.

The chart shows the comparison of the average loss in weight of fifty infants fed on the breast every three hours during the day and every four hours during the night with fifty fed in the same way, but, in addition, as much as they would take of the formula at the same intervals as stated above. The cases were taken consecutively, eliminating the babies weighing at birth under 6 pounds and also

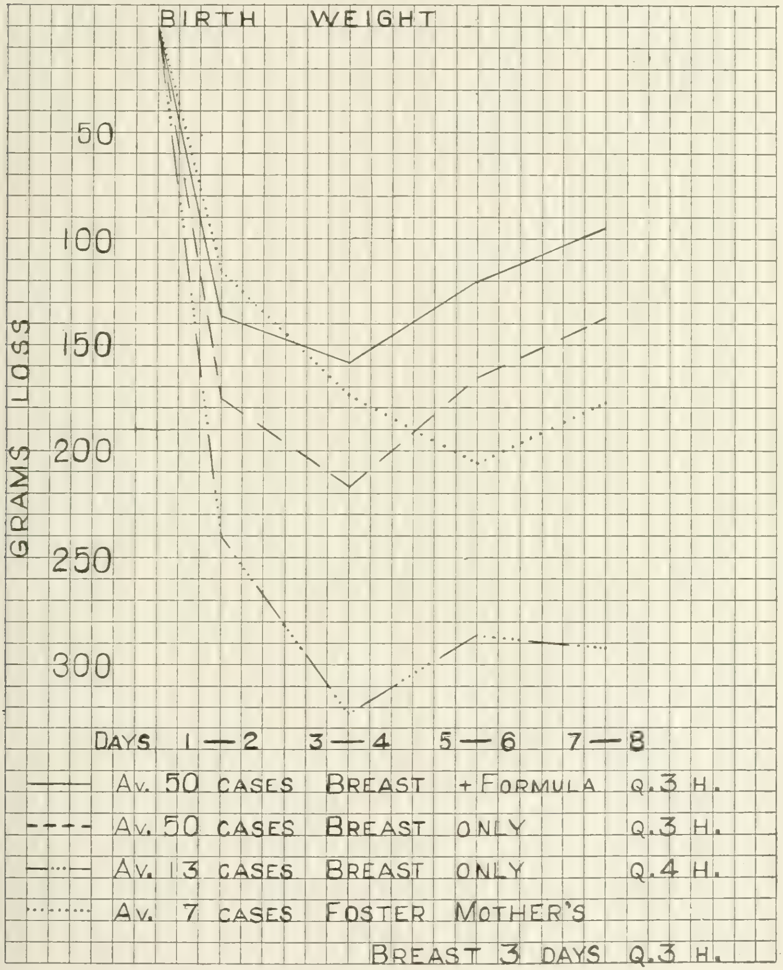

FIG. 1.—Showing average loss from birth-weight of infants fed in different ways.

eliminating those whose mothers were known to be abnormal. The breast-fed infants were taken from the months of October and December, 1913, and the breast- and formula-fed were born in October, and November, 1914. For comparison with these curves is one showing the effect of varying the number of feedings a day. The thirteen cases fed five times a day show a decidedly greater loss than the others and a less prompt return toward the original weight. This four-hour interval was discontinued because of the great initial loss. The curves show the fall from birth weight by averaging the lowest weight in two-day intervals. This method of averaging the weights was adopted because weights were not taken on Sunday and as a result some eight-day charts lacked two weighings; also many of the first-day weights were taken a few hours after birth. The curves could not be carried farther because so many of the children returned to their homes on the ninth day. Apparently the addition of the formula feeding reduced the primary loss in weight and led also to a quicker return toward the birth rate.

C. *Determination of the Heat Production.*—In order to adapt formula feeding to the actual needs of the infant, it is necessary to know its energy requirements during the first week of life. To what extent the loss in weight during the first days represents glycogen or fat, or how long it requires to exhaust any store of glycogen which the child may have at birth is not as yet sufficiently known. To judge by the respiratory quotients of the new-born infant, which have thus far been published by Mensi, Scherer, and Babák, the child has little or no glycogen to start off with. As we shall see later, however, there are reasons for distrusting the results of these authors.

There were various reasons for believing that the heat production indirectly measured from the data furnished by a respiration apparatus would be just as valuable as if measured directly by means of a calorimeter, and at the same time such an apparatus would be much more practical for use at the hospital. Howland, working in Dr. Lusk's laboratory, found that with young children the heat production (expressed in calories per hour) as measured by the calorimeter differed from the heat production as calculated from the respiratory exchange and the nitrogen output, on six different days, as follows: 2.0, 4.1, 0.7, 1.7, 2.7, 1.8 or 2.1 per cent. on the average. This places the difference between the direct and indirect methods of measuring the heat production below the variations in the direct method.

The apparatus which we have used consists of a Freas electric constant-temperature incubator having an air-tight inner chamber connected with the Benedict "universal respiration apparatus." An ice-water coil was made to surround the inner box so that the heating coil of the incubator worked against the cold produced by the circulating water. Glass doors were placed in the front of both chambers so that the child was constantly in view throughout its entire length(14).

At the beginning of this series the baby was placed on a rubber bed which was connected with the tambour recording on a drum on top of the incubator. Difficulties encountered in keeping the transmission system air tight led to the abandonment of this particular bed, and, in order to save the time necessary for reconstructing it, in considerably over one-half of the experiments, the notations of a nurse were relied upon as a record of the child's movements. The nurse sat in front of the glass door with the stethoscope tubes in her ears, the bell being connected by adhesive strips directly with the infant's chest. She kept her pencil on a paper ruled into divisions representing the exact minutes of the experiment. While the baby was quiet she traced a straight line, and at the slightest motion she zigzagged the line, or otherwise varied it for particular kinds of motions, crying, etc. This method was adopted in accordance with the suggestion of Schlossmann and Murschauser(15). From this record it was possible to give (Table V) the exact number of minutes during which the baby slept or was awake or cried during the observation period.

After a number of trials with different temperatures inside the incubator, ranging from 24 to 30° C., a temperature of 28 to 29° was finally fixed upon as most conducive to quiet sleep. A temperature much above 29° will cause the infant to perspire, especially while crying, while a temperature as low as 25° seemed at times to cause muscular motions of readjustment or even waking before the end of the period. At the temperature selected only a light blanket in addition to the regular hospital clothing was required to keep the baby comfortably warm. No attempt was made to collect the urine of these new-born infants because it was realized that very little difference would result from the omission of the nitrogen in the calculation of the heat production.

In all, some ten or eleven babies were used but the tables include results for only six of these. The experiments were incomplete for the other cases because of crying. Considerable inconvenience was experienced on this account before the higher temperature was adopted. Because of a fear also that the restlessness might be due to the very dry atmosphere produced by the drying bottle, a moisten-

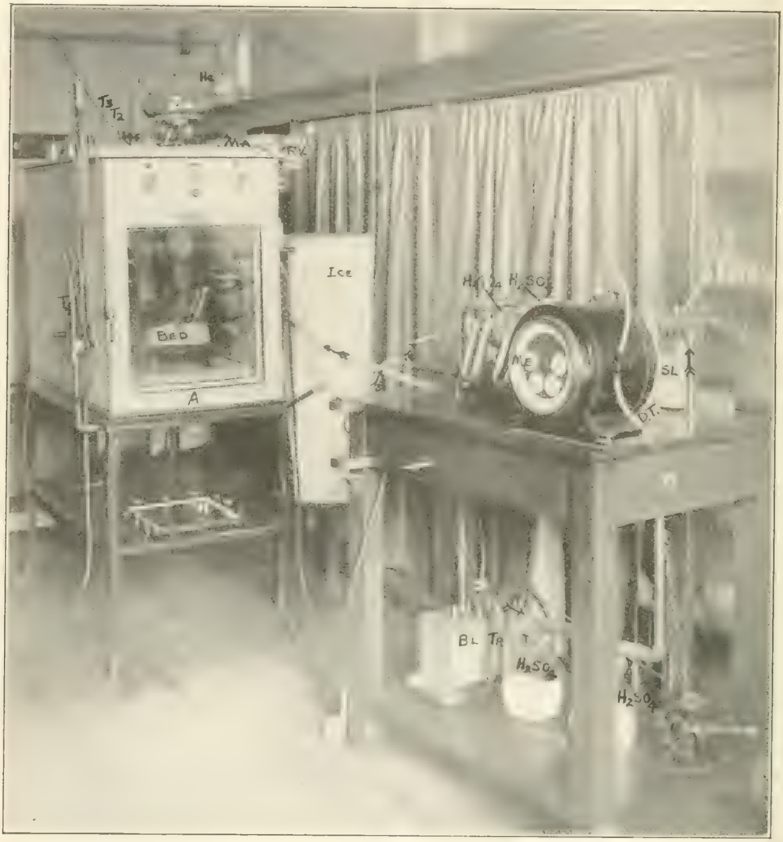

FIG. 2.—General view of respiration incubator used in this investigation. *A*, Freas electric incubator (Eimer and Amend); *B*, Benedict universal respiration apparatus; *O*, oxygen tank; *R.V.*, reduction valve; *Ma*, magnet; *Ba*, rubber bag for regulating inflow of oxygen; T_2, T_3 and T_4, thermometers (two other thermometers, one in the ingoing air and the other in the second acid bottle, do not show). T_2 extends into the outer chamber and T_3 into the inner chamber. The inner chamber containing the bed is seen through the double glass doors. *cc.*, Cooling coil; *ice*, ice-tank through which cooling stream of water flows before entering incubator (large arrows show direction of ventilating air current). *Bl*, Blower, *Tr*, trap. H_2SO_2, Acid absorbers; those on under part of table absorb water given off by child, those on top of table arrest any water coming from the soda lime (*S. L.*) which absorbs CO_2. *R*, Residual tubes for sampling air; *Mc*, meter which measures sample. Small arrows show course of the sample. From the drying tower (*D. T.*) the air passes back to the main circuit through a tube running under the table.

ing bottle was introduced between this and the respiration chamber. This gave the air in the box considerable moisture, and for a time it was thought that the babies were more quiet. Before the work was completed, however, the dry air was used once more, and it became apparent that the children slept as well as in moist air. The early difficulties, therefore, had nothing to do with the condition of the air in this regard. The influence of moisture on the metabolism will be mentioned later.

None of the babies of the series had any temperature or other manifestation of ill-being after the usual sojourn in the respiration chamber, although one infant who had been kept in the box only ten minutes, and was removed because of crying, did develop a temperature subsequently and lost considerable weight. While it caused some anxiety at the time, there was no evidence that its trouble had any relation to its use in the respiration chamber; furthermore it entirely recovered in a few days.

Because of difficulties with the first reduction valve made for the small oxygen cylinder, the oxygen was admitted into the chamber in this series of experiments by hand. Two signals were given (one a flash of light from the series of lamps used as resistance in the circuit operating the magnet, and the other a sharp metallic sound produced by the magnet itself) at the moment the oxygen tension fell sufficiently to make electric contact (see paper by Murlin referred to above). Sufficient oxygen could be introduced at one time to keep the pressure above the contact point with these very young infants for from eight to ten minutes. It therefore caused very little inconvenience to admit the oxygen in this way. A five liter sample of residual air was taken at the end of each period and corrections were made for this as well as for changes in the temperature of the circuit or in the barometer.

DISCUSSION OF RESULTS.

Table IV shows the experiments in the order in which they were made and also the conditions with regards to weight, age, the time and amount of the last feeding, the time and result of each period, and the average temperature of the incubator.

It will be seen that in five out of the nineteen days of observation the infant had received no food of any kind from birth.

The subjects range in age from six hours at the moment of beginning the observation, to twelve days. All were normal infants though one of them (Wyda) was distinctly under weight and another (Burke) was heavier at birth than the average.

TABLE IV.—SUMMARY OF OBSERVATIONS ON NEW-BORN INFANTS.

No.	Name	Age	Net Wgt.	Date of Exp.	Time last food	Amount last food	Period	CO₂ elim.	O₂ abs.	R. Q.	Average temp. of incubator
		Days	Kgm.	1913	P. M.		P. M.	liters	liters	....	C.
1	Knipe (dry air)	8	4.4	Dec. 13	....	....	4.05–4.45	1.388	1.407	0.98	26.6°
		10	4.4	Dec. 15	5.00	112 gm. mother's milk	6.31–7.31	1.483	1.653	0.897	28.5°
		11	4.4	Dec. 16	4.15		4.56–5.56	1.779	1.843	0.965	28.6°
							5.56–6.56	2.436	2.428	1.003	28.6°
		12	4.3	Dec. 17	3.45	42 gm. mother's milk	4.36–5.36	1.726	1.694	1.010	27.7°
							5.36–6.36	1.625	1.852	0.877	28.5°
2	Soranto (dry air)	9	3.7	Dec. 19	3.05	42 gm. mother's milk	3.46–4.46	1.250	1.678	0.728	27.3°
							4.46–5.53	1.440	1.695	0.849	27.4°
3	Barrett (moist air)	3	2.96	Dec. 29	2.45	56 gm. mother's milk	3.30–4.30	0.842	1.113	0.757	27.5°
							4.30–5.37	0.942	1.380	0.683	27.9°
4	Wyda (moist air)	Hours 6	2.9	1914 Jan. 9	No food		3.04–3.42	0.769	*	....	28.1°
							3.42–4.27	0.796	0.709	1.123	27.8°
		31	2.82	Jan. 10	No food		3.40–4.25	0.627	0.957	0.655	28.5°
							4.25–5.10	0.607	1.041	0.670	28.3°
		80	2.75	Jan. 12	3.05	28 gm. mother's milk	3.36–4.21	0.624	0.889	0.702	28.5°
							4.21–5.06	0.714	1.024	0.697	28.1°
		104	2.87	Jan. 13	2.15	28 gm. formula I	2.55–4.24	1.277	1.810	0.702	27.7°
	Wyda (dry air)	Days 6	2.87	Jan. 15	1.30	42 gm. mother's milk	3.08–4.39	1.364	1.810	0.753	29.6°
		6	2.87	Jan. 15	5.30	56 gm. mother's milk	6.40–8.11	1.465	1.630	0.898	29.2°
5	Burke (moist air)	Hours 6	4.6	Jan. 9	No food		5.25–6.04	0.757	0.853	0.853	28.2°
		31	4.49	Jan. 10	No food		6.05–6.46	0.763	1.135	0.673	28.6°
							6.40–7.26	0.719	(1)	....	28.3°
		80	4.27	Jan. 12		40 gm. mother's milk just before experiment.	6.24–7.05	0.803	1.118	0.718	28.3°
		104	4.4	Jan. 13		87.9 gms. mother milk, and formula I just before experiment.	7.05–7.44	0.741	0.990	0.749	28.5°
							5.10–5.46	0.792	1.094	0.724	29.0°
							5.40–6.36	0.845	0.993	0.851 (2)	28.5°
	Burke (dry air)	Days 8	4.29	Jan. 17	3.45	53 gm. mother's milk	4.14–5.39	2.385	3.334	0.715	28.2°
		8	4.29	Jan. 17	6.22	33 gm. mother's milk	6.52–8.11	1.994	2.512	0.792	28.1°
6	O'Connor	Hours 27	3.25	Jan. 19	Water only from birth		3.15–4.15	1.677	2.244	0.747	29.1°
							4.15–5.15	1.618	2.257	0.717	29.2°

*O_2 not determined; (1) residuals low; (2) High R. Q. due to crying.

In only five instances out of the twenty-eight different periods were the respiratory quotients above 0.90. One of these occurred with the child Wyda only six hours after birth. The respiratory quotient at this early time in postnatal life is of particular interest because it indicates the kind of material available for combustion as the child breaks connection with the maternal circulation. A respiratory quotient higher than 1.00 is commonly interpreted as a sign not only of carbohydrate combustion but of a surplussage of carbohydrate which is being converted to fat. Deficient oxygen absorption, however, would give the same result. Hence it would be going too far to draw this conclusion from a single instance. The Burke child examined on the same day and likewise, fortunately, at six hours of age, gave a respiratory quotient of 0.85. Assuming that oxygen absorption is normal at this early age, that is to say, is just rapid enough to meet the requirements of combustion, such a quotient would indicate the combustion of a considerable amount of carbohydrate (glycogen). We know, by analogy at least from the observations of Lochhead and Cramer(16) on new born-rabbits, that the child born at term has in its liver a considerable store of glycogen.

The respiratory quotients obtained on the second day after birth (Wyda, Burke and O'Connor) indicate clearly that this reserve of carbohydrate cannot be sufficient to meet the needs of the infant for more than one day. The combustion at this time includes little, if any, carbohydrate. Neither of the three children up to the time of observation on the second day had received anything but water. With two of them (Burke and Wyda) the respiratory quotients given in the table are in fact several points lower than would be expected even on the basis of a pure fat combustion. An extraordinarily large absorption of oxygen such as may take place following a condition of asphyxia, where, in other words, the absorption is in excess of the needs for combustion, would also explain quotients lower than 0.71. There is a possibility, which will be mentioned presently, of an alteration in the respiratory exchange in moist air. Since, however, the third child (O'Connor) in dry air gave respiratory quotients of 0.74 and 0.71 on the second day, and in the absence of any evidence that the absorption of oxygen at this time is not perfectly normal, we feel justified in asserting that the new-born by the end of the first twenty-four hours has practically reached a condition of starvation, that is, it has exhausted its reserve of circulating carbohydrate, its protein is not easily mobilized because of the strong tendency of the actively growing protoplasm in the opposite direction, and it is reduced to a basis of nearly pure fat combustion. This cannot continue long without producing a condition of acidosis. Murschauser(17) reporting observations made with Schlossmann at Düsseldorf states that an infant excretes a considerable amount of acetone and β-oxybutyric acid on the first day of fasting. Should the child be very thin at birth, common sense would seem to dictate, therefore, that the child should be fed certainly by the end of the first day. If the breast is not producing enough for the requirements, the formula feeding should be resorted to.

Following these observations on the second day both the Wyda and the Burke children received all of the milk they could get from the breast, and on the fourth day received formula feedings as well. It is to be observed that the respiratory quotients remain low up to the sixth day when they rise to the level (0.85 to 0.90) commonly found for a whole milk diet (see Murlin and Hoobler, *Amer. Journ. Dis. of Children*, Feb., 1915).

Up to this point all the determinations with these babies had been made with a large amount of moisture in the air. In order to test the effect of this condition on the metabolism, the child Wyda was on January 15 placed first in moist air and then, after removing the moistening bottle and thoroughly drying the ventilating system, was two hours later examined in dry air. According to the residual analyses the air in the first experiment contained 0.0156 liters of water vapor (average of two determinations) per liter of air, or, at 27° nearly 70 per cent. of saturation; while in the second experiment the amount was 0.0043 liters per liter of air, or about 20 per cent. of saturation. The respiratory quotient in the dry air was noticeably higher than in the moist air. It should be noted from the table that the effect of food was carefully controlled. The high quotient resulted from a twofold change: higher carbon dioxide and lower oxygen.

This recalls a similar observation as regards carbon dioxide by Murschauser and Hidding(18) on guinea-pigs. They found that more carbon dioxide was given off in dry than in moist air, because, so the authors think, the dry air facilitates the loss of heat by the evaporation of water, which is then immediately compensated for by an increased combustion. McLeod(19) had previously tried the same conditions with rats and had observed no difference in the excretion of carbon dioxide, but Langlois and Socor(20) have recently confirmed the observation as regards the influence of moist air on guinea-pigs. With their apparatus Murschauser and Hidding had no means of determining the respiratory quotient; consequently any influence on the absorption of oxygen would escape them. The higher excretion of CO_2 would not of necessity denote a higher heat production, and in fact the present observation of a lower absorption of oxygen directly contradicts their explanation (Table V). The trial with the moist and dry air successively was repeated two days later with the Burke child, but, unfortunately, the result is in doubt, so far as the heat production is concerned, because the child cried, and, crying more in the first than the second period, vitiated the comparison. The respiratory quotient, however, is again higher in the dry air. The results for all of the moist-air experiments would have been left in doubt by these comparisons, were it not for the high quotients obtained on the first day of their lives with both the Wyda and Burke babies in moist air, and the low quotients with the O'Connor child obtained on the second day in dry air. The R. Q. with alcohol throws no light on the question, because the same quotients were obtained in both moist and dry air; thus, January 5 and 8, in moist air, 0.66 and 0.65; on January 20 in dry air, 0.66 and 0.65. No explanation can be given at this time. The matter will, it is hoped, receive further attention soon. Should these observations be confirmed a partial explanation would be given for the extremely low quotients of Scherer(21) and of Babak(22); for it is evident from the description of the apparatus used by these investigators given by Professor Marês, that the child was exposed to an atmosphere practically saturated with moisture. The apparatus with which Mensi(23) obtained his extremely low quotients on new-borns is not known. Since it is usual with an apparatus of the kind used in these observations to send the air directly from the drying bottle to the respiration chamber, and perfectly theoretical quotients have been obtained with this apparatus on older children in this way, and finally, since the quotients obtained with dry air in this series more nearly represent expected results under the conditions, it is better to trust the results so obtained. The quotient of 0.67 on the second day for Wyda and Burke therefore should be accepted with caution. The correct value is probably in the neighborhood of 0.71.

By the end of the first week and thereafter the quotient has returned to the expected level for a whole milk diet, indicating that the various constituents are now present in sufficient amount to play their normal rôles in nutrition.

Metabolism in Relation to Body Weight.—Table V summarizes the energy metabolism for the entire series giving calories per hour, calories per kilogram and hour, and calories per square meter and hour for the several formulæ in parallel columns. In the opinion of the writers it is better to give the results only for the actual unit of time employed in the determination than to express them for the twenty-four hour periods; for it is obvious that when the child sleeps for an entire hour, as they did in most instances in this series, the metabolism obtained does not represent an average condition for the

TABLE V.—HEAT PRODUCTION OF NEW-BORN INFANTS.

No.	Name	Age at beginning of observation	Av. pulse rate	Condition	Cal. per hour	Cal. per kgm. per hour	Cal. per square meter per hour		
							$11.9\sqrt[3]{(W)^2}$ Meeh	$10.3\sqrt[3]{(W)^2}$ Lissauer	$y = mx + b$ Howland and Dana
		Hours							
1	Wyda	6	117	Fasting, sleeping	5.640	1.94	23.67	26.97	26.51
2	Burke	6	115	Fasting, sleeping.	6.724	1.46	20.43	23.07	22.78
3	O'Connor	27	127	Fasting, crying half of time	10.61	3.28	40.59	46.90	46.09
4	Wyda	31	110	Fasting, sleeping.	6.255	2.22	26.54	30.66	29.90
5	Burke	31	119	Fasting, sleeping, few muscular twitchings	8.704	1.94	26.87	31.05	30.02
6	Barrett	72	119	Sleeping, cried out once	5.506	1.85	22.44	25.93	25.49
7	Wyda	80	117	Sleeping, few muscular twitchings	5.972	2.18	25.57	29.54	29.02
8	Burke	80	114	Sleeping, few muscular twitchings	7.101	1.66	22.67	26.19	25.43
9	Wyda	104	117	Sleeping, few muscular twitchings	5.252	1.83	21.85	25.25	24.82
10	Burke	104	109	Sleeping, cried at end	7.500	1.77	23.47	27.12	26.27
11	Wyda (moist air)	6th day	109	Sleeping, few muscular twitchings	5.616	1.95	23.37	27.00	26.54
12	Wyda (dry air)	8th day	100	Cried out few times.	5.347	1.86	22.25	25.71	25.27
13	Burke (moist air)	8th day	120	Slept 34 min. out of 85; cried 23 min.	11.00	2.56	35.01	40.45	39.26
14	Burke (dry air)	8th day	115	Slept 65 min., cried 12 min.	9.04	2.10	28.77	33.24	32.27
15	Knipe	8th day	115	Cried half of time	10.533	2.4	32.96	38.07	36.88
16	Soranto	9th day	122	Whimpered eight times; cried last 7 min	8.156	2.2	28.65	33.10	32.41
17	Knipe	10th day	122	Slept entire time.	8.139	1.85	25.47	29.43	28.51
18	Knipe	11th day	(?)	Cried most of time.	10.730	2.44	33.58	38.80	37.58
19	Knipe	12th day	126	Slept all but 17 min..	8.817	2.05	28.02	32.37	31.41
				Mean of sleeping periods	6.73	1.87	23.70	27.33	25.88
				Mean deviation from mean		±0.181	±1.60	±1.80	±1.77
				Mean deviation in percentage		9.6%	6.7%	6.9%	6.8%

entire twenty-four hours. The same could be said of any other particular condition. In fact, it would be next to impossible to find a short period or to arrange conditions for one which could be said to represent average conditions for twenty-four hours. It will avoid confusion in the literature later if workers in this field of metabolism forsake at once the old custom of expressing results for a twenty-four-hour period, unless the actual period of observation is twenty-four hours or nearly so.

The hourly results here shown represent the average in most cases of two consecutive periods. In a few instances there was a single short period (never less than forty minutes) and in a few others a single long period of about an hour and a half. On seven out of the nineteen observation days the subject cried enough to raise the metabolism perceptibly. The remaining twelve days can be safely compared as representing the minimum degree of activity, following, in all but five days, the usual feeding at the breast. (See Table IV.)

The average heat production per hour for the four babies who slept throughout the periods is 6.73 calories or 1.87 calories per kilogram of net body weight. As compared with the adult (1 calorie per kilogram and hour) this metabolism is high, though not as high as has been previously recorded(24) for the new-born. As compared with older infants the metabolism is low(25). It will be noted at once that the metabolism is noticeably higher reckoned on a basis of weight for a light baby (Wyda, birth weight 6 pounds) than for a heavy baby (Burke, birth weight 10 pounds, 3 ounces). Bringing together all the periods for these two babies for the first four days of observation we have the following:

TABLE VI

Weight, kgm.	Age hours	Cal. per hour.	Cal. per kgm. and hour	Cal. per square meter and hour (Meeh)
W. 2.9	6	5.649	1.94	23.67
B. 4.6	6	6.724	1.46	20.43
W. 2.82	31	6.255	2.22	26.54
B. 4.49	31	8.704	1.94	26.87
W. 2.75	80	5.972	2.18	25.57
B. 4.27	80	7.101	1.66	22.67
W. 2.75	104	5.252	1.83	21.85
B. 4.27	104	7.500	1.77	23.47
W. Average	....	5.782	2.04	24.43
B. Average	....	7.514	1.70	23.36

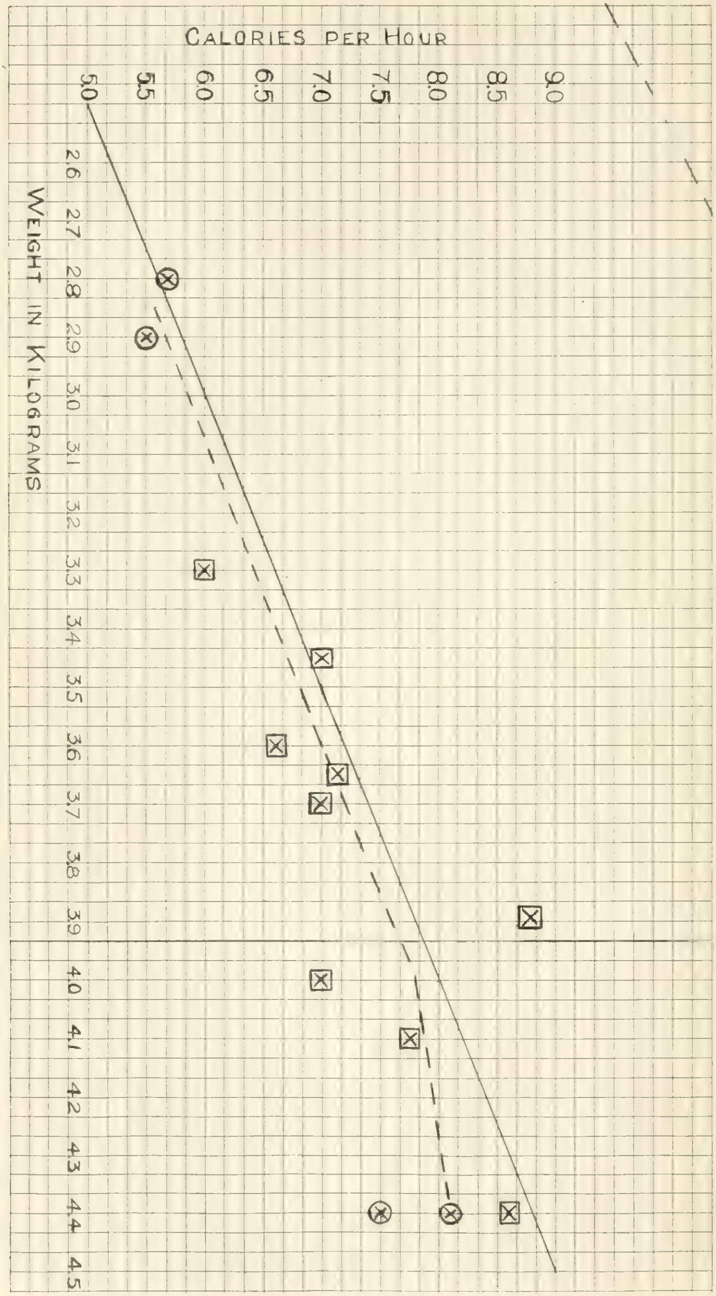

Fig. 3.—Chart representing the metabolism of the new-born infant per kilogram of body weight while sleeping; × in circle represents the cases of series; × in square.

This result is what would be expected if Rubner's law of surface area applies to new-borns (*cf.* below), *i.e.*, the heavier (fatter) infant should have the lower metabolism per unit of weight.

The only results in the literature with which these may be properly compared are those of Benedict and Talbot (26). Their "new series" contains observations on nine new-borns ranging in age from a few hours up to two weeks, while sleeping or very quiet. Their results on these particular subjects have not as yet been published in full, but sufficient data are given (on twenty-four-hour basis) to permit of comparison. Reducing the metabolism to an hourly basis (Benedict and Talbot's periods were commonly much shorter than one hour in length) their results for nine "normal" infants under two weeks of age have been charted (Fig. 3) with the four from Table IV. The abscissæ of this chart represent the weights in kilograms and the ordinates represent the calories per hour. The junction of ordinate and abscissa then represents calories per kilogram per hour. As a convenient line of reference, the diagonal representing 2 calories per kilogram and hour has been drawn. All but three of the thirteen cases fall below that line. The mean for the thirteen cases would be a curved line running about as shown by the interrupted line. It begins at 2 calories per kilogram per hour and passes off the chart at about 1.7 calories per kilogram per hour, which are the figures given in the table above for the very thin and very fat babies during the first four days of postnatal life.

It is interesting also to observe that the energy metabolism is a little higher on the second day when these two babies had reached a point of practical starvation than on the first day when some reserve (glycogen) was available, or on subsequent days when feeding had begun. So far as could be determined, there was no difference in activity to account for this. One must conclude either that there was a slight starvation acidosis which might raise the metabolism (27), or that the dynamic action of mobilized body fat is greater than the dynamic action of the small amount of food received in the early days of nursing. In fact, there is every reason to believe that the dynamic action of an ordinary milk diet is very low(28).

The influence of crying on the energy metabolism may be clearly seen in the case of the Knipe child. On the tenth day of her life this

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represents cases from Benedict and Talbot's longer series. Abscissa weight in kilograms, ordinates calories per hour, the junction of abscissæ and ordinates calories per kilogram and hour. The diagonal line, used as a convenient reference line, represents 2.0 calories per kilogram and hour. The broken line is drawn to represent the mean of the thirteen cases.

child slept perfectly during the observation period, producing 8.14 calories per hour. The next day while crying "most of the time" she produced 10.73 calories, an increase of 31 per cent.

Schlossmann and Murschauser(29) witnessed an increase of 44 per cent. over the resting basal metabolism due to continuous crying; and Howland(30) an increase of 39 per cent. Since active crying represents the greatest degree of muscular effort for infants of this age, it may be safely stated that the utmost energy production of children who "cry a great deal" would not be more than 30 to 40 per cent. above the quiet sleeping metabolism. This makes it possible to estimate the maximum requirement of energy for combustion alone in the early days of life. If the average minimum be taken as 1.87 calories per kilogram per hour, the average maximum would not be more than 2.62 calories per kilogram and hour. Or, expressed in terms of a day's feeding, the requirements would lie between 45 and 65 calories per kilogram. It seems to the writers that this makes it clear that the usual allowance of 10 per cent. for nonabsorption leaves a very generous margin for growth, if a child in the early days is given as much as 90 calories per kilogram, and the question may very well be raised whether this is not too much for children kept comfortably warm.

As a practical conclusion of the inquiry with reference to the artificial feeding of the new-born to supplement the scanty supply from the breast, it would appear that 50 calories per kilogram on the average would be sufficient the first day to prevent loss of weight from organic substances and leave a considerable margin for nonabsorption. As the natural supply comes forward this, of course, should be reduced. The handling of different forms of carbohydrate by the new-born is a matter which should receive further investigation with the respiration apparatus.

Metabolism in Relation to Surface Area.—The calculation of the energy metabolism per unit of skin surface has been made according to the well-known formulæ of Meeh and of Lissauer and the equation of Howland and Dana.(31)

In order to form some idea as to which of these formulæ most nearly expresses the unit which is proportional to the heat production, the average deviation from the mean has been determined (Table V). Curiously enough, for the four children embraced in this summary (Wyda, Burke, Barrett and Knipe) the different formulæ serve equally well with perhaps a slight advantage in favor of Meeh's. This is not surprising in view of the fact that Meeh's measurements were made on normal healthy children while Lissauer's were made chiefly on atrophic or underweight children; and Howland and Dana's equation, being based on twelve from Lissauer's list and the two of Meeh, naturally give the surface less exactly for well-nourished children (32).

As compared with the unit of weight the unit of surface, it may be seen, is, for these cases, a little better. That is to say, the average divergence of individual determinations is less distant from the mean.

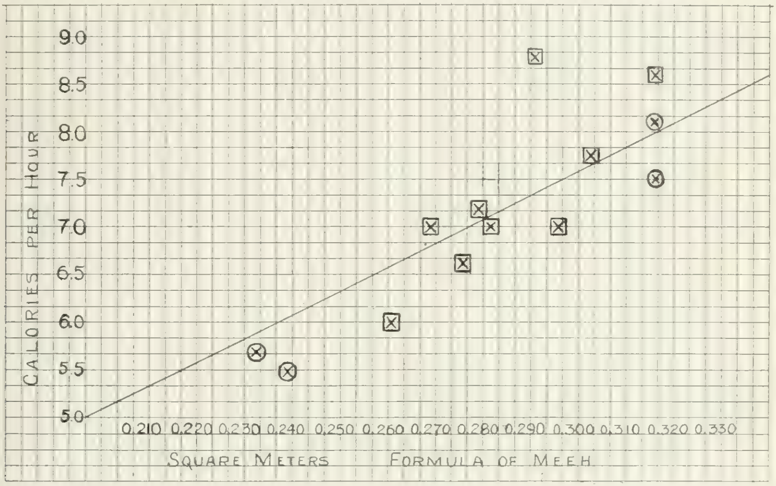

FIG. 4.—Chart representing the metabolism of the new-born infant in square meters of body-surface (Meeh's formula) while sleeping. ⊗ represents the cases of this series; ⊠ represents the cases from Benedict and Talbot's longer series.

Abscissæ represent surface area in square meters, ordinates colories per hour. The diagonal represents 25 calories per square meter per hour and is very close to the mean for the thirteen cases.

The chart (Fig. 4) shows this even better. Here again are included with the four infants of this series whose metabolism was obtained during quiet sleep, the nine of Benedict and Talbot. In this instance the diagonal represents 25 calories per square meter (Meeh's formula) per hour, and, as it happens, this represents very nearly the mean metabolism of the thirteen infants, six of them falling below and seven above the line. Du Bois(33) has found that the mean heat production of the normal adult at rest is in the neighborhood of 34 calories per square meter and hour.

SUMMARY AND CONCLUSIONS.

1. According to analyses reported in this paper, human colostrum on the second and third days of the puerperium has the following

composition: Protein, 2.3 per cent.; fat, 2.9 per cent.; milk sugar, 7.1 per cent., making a physiological heat value of 650 calories per liter. It is not, however, until the fifth day that sufficient breast secretion to supply the requirement of the new-born for combustion alone, to say nothing of growth, can be counted upon.

2. Statistical studies in this hospital show that supplementary feeding of new-born infants from the first day onward with a formula somewhat resembling colostrum in composition diminishes the initial loss in weight, accelerates the return to birth weight, and has no unfavorable effects.

3. The respiratory quotients of two new-born children examined at six hours of age indicate that the child has at birth some carbohydrate available for combustion. By the end of the first twenty-four hours, however, this supply is exhausted and the child has reached practically a pure fat combustion. If food is not supplied soon after this a starvation acidosis is likely to develop.

4. The energy requirement of the new-born kept comfortably warm and sleeping quietly may be placed tentatively between 1.7 and 2.0 calories per kilogram and hour, the lower figure for a very fat (10 lb.) child and the higher for a thin (6 lb.) child. Even vigorous crying does not raise this figure more than 40 per cent.

5. Comparing the results on four children of this series with those from nine new-borns in Benedict and Talbot's "new series," the indications are that the sleeping infant less than two weeks of age has a metabolism per square meter of body surface (Meeh's formula) of 25 calories per hour (or 600 calories in twenty-four hours). This is considerably less than has been previously estimated for children of this age.

6. It is estimated that 50 calories per kilogram per day in formula feedings to supplement the secretion from the breast is sufficient to supply the energy requirement, for combustion alone, of the new-born for the first twenty-four hours. As the child becomes more and more satisfied at the breast the formula feedings should be diminished.

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24. *Cf.* Babak, *loc. cit.*, and Carpenter and Murlin. *Archives of Int. Med.*, vol. vii, 1911, p. 184.

25. Benedict and Talbot, *loc. cit.*, and Murlin and Hoobler, *Amer. Jour. Diseases of Children*, Feb. No., 1915.

26. *Amer. Jour. Diseases of Children*, vol. viii, 1914, p. 1.

27. *Cf.* Benedict and Joslin., Carnegie Institution of Washington, Publ. No. 176, p. 125 *et seq.*; also Benedict and Higgins *Amer. Journ. of Physiol.* vol. xxx, 1912, p. 217.

28. Rubner and Heubner. *Zeitschr. f. exp. Path. u. Ther.*, vol. i, 1905, p. 1; also Murlin and Hoobler: *loc. cit.*

29. *Biochem. Zeitschr.*, vol. xxxvii, 1911, p. 23.

30. *Zeitschr. f. Physiol. Chemie.*, vol. lxxiv, 1911, p. 1.

31. *Amer. Jour. Diseases of Children*, vol. vi, 1913, p. 33.

32. For a fuller discussion of this relationship see Benedict and Talbot. *Amer. Jour. Diseases of Children*, vol. viii, 1914, p. 1.

33. DuBois. *Journ. A. M. A.*, vol. lxiii, 1914, p. 827. *Cf.* also Carpenter and Murlin, *loc. cit.*, for the heat production of the mother as compared with her new-born child.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Healing Process of the Infantile Bronchial Gland Tuberculosis.—It is well known that enlargement and caseation of the bronchial and mediastinal glands are among the most conspicuous morbid changes observed in tuberculous children. The disproportion between the pulmonary and the glandular lesion is reversed in the adult. Extensive, ulcerous, long-standing tuberculosis of the lung is generally found at the postmortem, coincident with bronchial glands of normal size or hardly enlarged, easily enucleated, and hardly even affected with caseous degeneration. One has sought to account for the predominance of caseation in the bronchial glands of the child by referring it to an assumed greater activity of the lymphatic organs in childhood, to all kinds of organs and more or less abstract differences between the infantile and adult organism. E. Rist (*Edinb. Med. Jour.*, 1914, n. s. xiii, 215) thinks we are nearer the concrete truth in assuming that caseation of the bronchial glands is not a specific character of childhood but of primary tuberculous infection. If, on the other hand, pulmonary tuberculosis of the adult is, as a rule, not accompanied by caseation of the corresponding bronchial glands, it is not because the lymph glands of the adult are essentially and physiologically different from those of the child, but simply because pulmonary tuberculosis of the adult is due to a reinfection.

Bronchogeneous, Placentogeneous, Dermatogeneous, and Enterogeneous Infection with Tuberculosis in Infancy.—C. von Pirquet (*Edinb. Med. Jour.*, 1914, n. s. xiii, 220) says that for the first year of life the bronchogeneous infection with tuberculosis is by far the most frequent way of entry (about 95 per cent. of all infections). The enterogeneous infection is not important—at least not in Austria (1 per cent. to 2 per cent. of all infections). A placentogeneous infection of the fetus is a rarity, as is also stomatogeneous and dermatogeneous infections. Prophylaxis of infant tuberculosis has chiefly to deal with the separation of the nursling from the coughing adults.

Congenital Pyloric Stenosis.—A. J. Walton (*Annals Surg.*, 1914, lx, 342) states that little evidence has been brought forward of the change that takes place in the pylorus itself after medical or surgical treatment of congenital pyloric stenosis. He records a case operated upon at two and one-half months which died from an intercurrent condition seven months after the posterior gastroenterostomy. The stomach was not dilated. The pylorus was markedly hard and thickened, forming a tumor-like mass ¾ inch in length. The pylorus was impervious to the passage of fluid, but there was a free passage through the gastroenterostomy opening which was large enough to easily admit the gloved finger. The gastroenterostomy opening was seen about 1 inch in diameter situated 1-½ inches from the pylorus. The pylorus, on section, showed an enormous hypertrophy of the muscular coats and the mucosa could be seen thrown into folds, which were tightly packed together so as to occlude the lumen. From the duodenal aspect the pylorus showed a characteristic projection into the duodenal cavity. Microscopic section of the pylorus showed that the thickening of the wall was due to a great hypertrophy of the circular muscular coats. Although none of the food passed through the pylorus and this latter structure was at complete rest, there was no alleviation of the muscular hypertrophy. The thickening of the pylorus was as marked at the postmortem examination as at operation and was impervious to the passage of water.

Enuresis.—A study by A. B. Schwartz (*Bost. Med. and Surg. Jour.*, 1914, clxxi, 631) of 226 cases of enuresis, 148 males, 98 females, 3 diurnal, 134 nocturnal, and 89 both diurnal and nocturnal, leads to the conclusion that the cause of enuresis in children is not the same in every instance. In some the nervous element undoubtedly plays a part, and in others faulty habits. Local irritation from any source is a predisposing cause. Excessive fluids result in greater secretion of urine, while too little fluid results in a concentrated urine, which, whether it contains crystals or not, may irritate the base of the bladder and cause the desire for frequent micturition. Enlarged tonsils and adenoids apparently have no connection with enuresis. Digestive disturbances did not in themselves have any connection with the condition, but it is conceivable that constipation may be a predisposing factor.

Voice Sign in Chorea.—Continuing his study of the voice changes in chorea, W. B. Swift (*Amer. Jour. Dis. Child.*, 1914, viii, 279) finds in twenty cases of chorea, with over 500 observations on the voice, a change of pitch and intensity in two cases out of three. These choreic voice changes are more frequent in the vowels, less so in whisper, whistle, consonants, air blow and holding of breath; and are less and less in frequence in this order. Other less frequent and less marked changes occur that seem of interest subordinate to those in the vowels. The most marked change occurred in the open prolonged sound of "a" as in "are," and therefore this is offered as the routine clinical test and method for the elicitation of the choreic voice sign.

Diagnosis and Treatment of Late Hereditary Syphilis.—B. S. Veeder and P. C. Jeans (*Amer. Jour. Dis. Child.*, 1914, viii, 283) present a study of 123 cases of hereditary syphilis. They have found the incidence of manifest hereditary lues of the "late" type much greater in proportion to the incidence of "early" syphilis than previous figures would indicate, the former comprising 60 per cent. of the series. The largest group of cases (43 per cent.) exhibited lesions of the central nervous system, but they particularly call attention to a group of cases with lesions associated as "rheumatic"—chorea, acute arthritis, torticollis, myalgia. By Wassermann reactions and the "therapeutic test" they have found that such lesions are not infrequently due to an hereditary syphilitic infection. It has been their experience that acutely developing lesions respond promptly to intravenous injections of neosalvarsan, but that in order to obtain any permanent results and prevent the recurrence of symptoms an intensive and long-continued mercurial treatment must be given in addition. The syphilitic infection—as measured by the Wassermann reaction—is most persistent, and although an intensive and uninterrupted antisyphilitic treatment has been given for nearly two years, they have not been able to obtain a negative Wassermann reaction in some cases. Moreover, the Wassermann reaction has usually returned when treatment has been interrupted in those cases in which it has become negative as the result of treatment. The writers do not feel that it has been demonstrated as yet that an hereditary syphilitic infection of the "late" type can be eradicated.

Subacute Atrophy of the Liver.—Subacute atrophy of the liver has been described by several authors during the past few years. It is a condition which closely resembles acute yellow atrophy of the liver in its etiology and initial symptoms, but it differs from acute yellow atrophy in that the progress of the disease is less acute, the onset of the second or terminal stage is delayed or absent, and fatal termination does not occur for weeks, months or even years after the initial symptoms. The condition is very rare. Twenty-two cases have been reported. As another instance, E. C. Dickson (*Amer. Jour. Dis. Child.*, 1914, viii, 357) records a case of severe jaundice of obscure origin, occurring in a child two weeks of age, and persisting without intermission until the death of the child at five months of age. The child grew and developed in a normal manner, and was never acutely ill until within twenty-four hours of death. When the child was three months of age, the liver and the spleen were found to be enlarged, but no other abnormalities were found. The stools were not acholic at any time during the progress of the disease, and the Wassermann reaction was negative. Death was preceded by severe respiratory distress and there was marked abdominal distention. No history of convulsions was obtained. Necropsy revealed a marked ascites, a small granular liver, a large indurated spleen, and large kidneys which showed marked parenchymatous degeneration. There was extreme general icterus, but no demonstrable stenosis of the bile ducts. Microscopic examination showed complete necrosis of the whole of the liver with the exception of a narrow zone around the margin where there was evidence of regeneration of liver tissue. The spleen, kidneys, pancreas and thymus showed some beginning fibrosis, but the blood-vessels in all the organs were apparently normal. There was marked parenchymatous and fatty degeneration and also necrosis of the renal epithelium. The most interesting points in connection with the case are the following: The obscure origin of the condition. The remarkably little effect produced on the growth and development of the child. The persistence of biliary secretion in the presence of extreme destruction of the liver tissue. The persistence of life, and the absence of evidences of hepatic insufficiency when so small a portion of living liver tissue remained.

Tuberculous Lesions in Infants and Young Children.—M. Wollstein and F. H. Bartlett (*Amer. Jour. Dis. Child.*, 1914, viii, 362) present an analysis of 178 autopsies at the Babies' Hospital of the City of New York, in which tuberculous lesions were found. These constitute 13.5 per cent. of all autopsies. A study of the earlier Babies' Hospital cases showed 16.4 per cent. tuberculous cases among 1131 autopsies. The contrast with adult percentages is very striking, whether we accept Lubarsch's figures, 69.2 per cent., or those of Naegeli, 93.1 per cent. as the average. In age the cases included in this study varied from two and one-half months to five years; 75 per cent. of the subjects being under two years of age. The largest number of cases were of inhalation origin, as shown by the large percentage of cases in which the pulmonary lesions were the most advanced in the body. The absence of tuberculous lesions from the lungs in fourteen cases and the presence of tuberculous lesions in the bronchial lymph nodes in seven of these seems to show that it is possible for the tubercle bacillus to pass through the lungs without localizing there. The writers agree with Ghon's conclusion that in children the primary infection of the lung is the usual mode of infection, for 82 per cent. of their cases were of this type. The marked tendency to rapid and general dissemination of the tuberculous lesions throughout the body in infants less than a year old is well shown. In view of that fact the survival of any young infant infected with tuberculosis for more than six months after infection is very remote, while healing of tuberculous lesions in young infants is practically out of the question. In this entire series not a single healed tuberculous lesion was encountered, and attempts at healing, shown by calcified areas, were found only five times in the lung and thirteen times in lymph nodes. Only twice was it found among infants less than a year old, and in both these cases the extensive generalization of tubercles throughout the body gave evidence that the small calcareous areas present did not prevent spreading of the infection. Encapsulation of a tuberculous lesion was not encountered in this series of cases. The predominance of respiratory over deglutition infection is indirect evidence of the quality of our milk supply, though it must not be forgotten that children may carry tubercle bacilli into their mouths by means of fingers infected by contact with dirty floors and furniture, as well as by means of food. The comparative frequency of tuberculous meningitis in young infants is noteworthy, as evidence of the very general dissemination of tuberculous lesions in these young subjects. The smaller proportion of cases of tuberculous meningitis among the children who acquire tuberculosis by ingestion as compared with those who become infected by inhalation, is in keeping with the fact that the deglutition cases show rather less tendency to generalization than do the respiratory cases.

Recurrent Meningitis due to Lead.—H. M. Thomas and K. D. Blackfan (*Amer. Jour. Dis. Child.*, 1914, viii, 377) record a case of recurrent meningitis, due to lead, in a child of five years. In both attacks there were headache, vomiting, convulsions, coma, optic neuritis and rigidity of the neck. In the second, a lead line and stippling of the red cells cleared up the diagnosis. The poisoning resulted from gnawing the white lead paint from the crib.

Hereditary Syphilis as a Social Problem.—Studying the vital statistics of St. Louis for 1913 and 108 cases of congenital syphilis seen in the out-patient department of the Children's Hospital during that year, P. C. Jeans and E. M. Butler (*Amer. Jour. Dis. Child.*, 1914, viii, 327) say that as a social problem, hereditary syphilis assumes relatively large proportions, one patient often representing a number of individuals needing treatment. Parents are frequently indifferent and fail to continue treatment. They also frequently fail to see the importance of having Wassermann tests made on the other children of the family, who may seem perfectly well, but who may have syphilis. In the case of such parental indifference such tests or treatment should be enforced. Hereditary syphilis is more frequent in illegitimate than legitimate children. The mortality is higher in illegitimate syphilitic infants than legitimate syphilitic infants. Hereditary syphilis in St. Louis is from two to three times as frequent in the colored as in the white race. The frequency of hereditary syphilis is greater among the infants in the writers' clinic than among the older children. The waste in potential life by miscarriages, and deaths in syphilitic families is twice as great as in nonsyphilitic children. Thirty-three per cent. of the syphilitic children over one year had permanent disabling damage. Eighteen per cent. of the syphilitic children over one year had long-continued temporary disabling damage. There is about five times as much feeble-mindedness in syphilitic families as in nonsyphilitic families. The mortality for artificial fed syphilitic infants is five times as high as for breast-fed syphilitic infants, not including deaths due to intestinal disturbances.

Neglect to Provide for the Infant in the Antituberculosis Program.—At the Tuberculosis Preventorium for Children at Farmingdale, N. J., 200 children are cared for, who range in age from four to fourteen years, and are selected by the tuberculosis dispensaries of New York City from households in which some member of the family is tuberculous, frequently suffering from open tuberculosis. These 200 children, at the present time, happen to represent 120 families, as, in many instances there are several from one and the same family. Inquiry by A. F. Hess (*Jour. A. M. A.*, 1914, lxiii, 2176) showed that there were forty-two infants under two years of age in these 120 homes, that in very many cases there is more than one member in the home suffering from tuberculosis; that frequently the tuberculous disease is in the second stage; that in many families there are two infants exposed to infection; that even when the tuberculous individual has left the home for a sanatorium, this removal has occurred so recently that the infants have been exposed for many months; that the number of children in these families is unusually large, averaging somewhat over five to a family. We know not only that infection occurs during early childhood, but that it occurs frequently in infancy, and that the younger the child the graver the prognosis of the disease. In view of these facts, Hess urges the establishment of tuberculosis preventoriums for infants.

Gonococcus Septicemia with Arthritis Following Scarlet Fever.—Three cases of generalized gonococcus infection with arthritis are recorded by M. Nicoll, Jr. (*Arch. Pediatrics*, 1914, xxxi, 804) not on account of the rarity of the condition, but as demonstrating the necessity for routine blood cultures in cases of so-called scarlatinal arthritis. How many cases of scarlatinal rheumatism, occurring especially in hospital practice, are really due to gonococcus infection it is not possible to say, but there can be no doubt that a number of such cases escape recognition through neglect to take blood cultures. The presence of a maculo-papular eruption not usually seen in cases of scarlatinal arthritis, suggesting the presence of some blood infection, was largely responsible for the taking of blood cultures in the cases reported and thus led to a correct diagnosis.

Stoeltzner's Casein-calcium Milk in Summer Diarrheas of Infancy and Early Childhood.—During the past summer W. L. Rost (*Arch. Pediatrics*, 1914, xxxi, 849) has used casein-calcium milk in the treatment of fifty-six cases of summer diarrhea. No patient ill less than three days is included in this series. Age varied from three and one-half months to two and one-half years. Many of the children were rachitic, anemic, poorly nourished, underdeveloped and underweight. The original formula was adhered to as a rule; dextrimaltose was rarely added before the third day; in about 50 per cent. of the cases, cereal decoction was employed instead of water; small amounts were given at four-hour intervals; water *ad libitum* if necessary; the total quantity of food was increased from 2 to 4 ounces daily, depending upon the condition and age of the child. It was well taken by all except one. This was a child of two years, extremely difficult to manage by the mother. This milk was given for periods of time varying from four days to several weeks. No vomiting occurred. A district nurse visited all of the out-patients and demonstrated its preparation; the mothers experienced little difficulty in making this food after being shown once. All cases showed improvement in about four days, in most children in two days assuming a yellowish color, semisolid, one or two daily. About 49 per cent. gained and 21 per cent. remained stationary; in 30 per cent., the weight could not be observed on account of the very irregular attendance of the mothers. On account of the simplicity of its preparation and inexpensiveness, casein-calcium milk is particularly useful in the management of nutritional disturbances applying to out-patient departments for treatment. It may be readily used in those nutritional disturbances where Finkelstein and Meyer's protein milk is indicated, but cannot be employed on account of its expense or taste.

Etiology and Prevention of Rickets.—In the prevention of rickets, says D. Curle (*Practitioner*, 1914, xciii, 670) an important requirement is larger and less closely packed dwellings. Proper feeding can, to some extent, counteract the bad effects of impure air, and more exact rules of feeding must in future be the law. Children at the breast must be fed at regular intervals, for too frequent feeding means overfeeding; when that happens the milk sugar of the maternal milk is absorbed in excessive quantity, to the rejection of fats and proteids. When artificial feeding must be resorted to, our studies clearly indicate that milk sugar, or cane sugar, must be kept short of excess. The rule must, therefore, be: "With carbohydrates, underfeed;" using as a control, sweating when asleep. "With proteids, in this case, cow's milk, feed up to what the digestive organs of the infant can bear;" using as a control, the appearance and disappearance of undigested casein in the motions. "With fats, in this case cream, overfeed as much as the infant can comfortably stand," using a control, diarrhea. When we overfeed with carbohydrates, we throw a strain upon the lungs, which, in the infant, are weak and will fail to sustain it; when we overfeed with proteids, we throw the strain upon the kidneys, which, in the infant, are, in proportion to the body weight, relatively much stronger than in the adult; and when we overfeed with fats, we usually do neither, for any excess is not assimilated but will pass out in the feces and help to prevent constipation. In carrying out our first rule of underfeeding with carbohydrates, and determining the amount of milk sugar to give daily, since cow's milk and cream contain approximately 20 grains to the ounce, and human milk 30 grains, when diluting cow's milk for infant feeding we must add 10 grains of milk sugar for every ounce of milk or cream used, and 30 grains for every ounce of water used. An infant a day old having ten feeds, each consisting of milk ½ ounce, cream ¼ ounce, milk sugar approximately 30 grains, water ¾ ounce, consumes daily 450 grains; at seven days, ten feeds, 2 ounces each, 600 grains; at nine months, four feeds daily, 8 ounces each, 960 grains; and at ten and one-half to twelve months, four feeds daily, 9 ounces each, 1080 grains per day. On these quantities Curle has never found a child, in pure air, to show symptoms of rickets. 925 grains of carbohydrate is given in the Münich table as the daily minimum for a child, from one to one and one-half years of age, some requiring more; our formula is, therefore, a practical one. When more fat is necessary than is given in the milk mixture, butter rolled into balls the size of a 5-grain pill, by means of milk sugar, is quite safe and to the infant, agreeable. From twelve to twenty or more may be given in a day. In the treatment of rickets, beyond the occasional use of small doses of calomel, gray powder or castor oil, to clear the bowels of decomposing food, and assist in reducing the hyperhydremia, drugs are quite unnecessary.

Transfusion in the Treatment of Hemorrhagia Neonatorum.— To the thirty-seven cases of transfusion in hemorrhagic disease of the new-born collected by Lespinasse. R. M. Green (*Bost. Med. and Surg. Jour.*, 1914, clxxi, 715) adds four cases. The four deaths in this series of forty-one cases represent a mortality of 10 per cent. As the mortality under older methods of treatment has been at least 50 per cent., this in itself seems sufficient evidence for the value of transfusion. A probable further reduction of mortality may be expected in future from its more prompt and universal application. Of all the methods thus far devised, that of Kimpton seems distinctly superior in certainty, speed, and ease of accomplishment. The greatest present need of further investigation in hemorrhagia neonatorum is into the knowledge of its probably syphilitic etiology.

Asthma in Children: Its Relation to "Egg Poisoning".—During the past two and one-half years F. B. Talbot (*Bost. Med. and Surg. Jour.*, 1914, clxxi, 708) has studied eleven cases of egg anaphylaxis. Ten of these eleven cases had had eczema some time during infancy or childhood. Six of the cases had severe asthma. These cases were studied in the first place to see if there was any connection between eggs in the food and the asthma; and in the second place a skin test was made according to Schloss to determine if the individual was sensitive to eggs. Although the underlying cause of asthma was anaphylaxis to egg albumen, the writer emphasizes the fact that egg albumen is not the sole cause of asthma. Hay fever, or anaphylaxis to the pollen of flowers, was a complicating factor in some cases, horse asthma in others, and the last case was complicated at first by an anaphylaxis to beef juice. The family history suggests that a sensitive condition of the blood may be transmitted from one individual to another. This theory receives support in the fact that this transmission of sensitivity of the mother to her offspring has been noted in animals. If this is not transmitted directly, a predisposition toward sensitization may be inherited. It seems more probable that the sensitivity may be acquired. The diagnosis is made from the history and by the specific skin reaction. When the diagnosis is made, one of two courses may be pursued: either all egg may be excluded from the diet, thus removing the cause of the asthma; or the patient may be immunized to egg white albumen. The latter course seems to be the most logical because it is almost impossible for a person of this type to absolutely exclude eggs from their diet. Small doses of egg white should be given in capsules, the dose being gradually increased until the patient is immunized. Great care should be taken to start below the limit of tolerance and to gradually work up from this point. Usually it is safe to commence with 1 milligram of egg white a day, but occasionally even this dose is too large. It seems probable that those patients suffering with horse asthma will have to be immunized subsequently to horse serum. The same statement applies to other proteins which may be found to have a connection with asthma.

Comparative Results of the Luetin Reaction and the Wassermann Reaction in Hereditary Syphilis.—Germain Blechmann, Maurice Delort, and A. Tulasne (*Ann. de méd. et chir. inf.*, July, 1914) give the results of their experiences with the Wassermann and the luetin reactions in hereditary syphilis. The intradermic reaction of Noguchi is difficult to perform serially in infant services. In contrast to the Wassermann it requires a constant cooperation of the parents and the clinician which is difficult to obtain in hospital practice. The significance of the reaction can be obtained only as a result of a series of tests. Considered separately the Noguchi test is difficult to interpret, the difference between a doubtful and a negative test being rather theoretical than real. The activity of luetin is not constant. The intradermic reaction of luetin would give in hereditary syphilis a minimum of 70 per cent. of positive cases. In true congenital syphilis the Noguchi test has seemed less sensitive than the Wassermann when made with a human antigen. In cases in which the Wassermann was negative and syphilis appeared to be absent the Noguchi has been positive. This conflict with the Wassermann and the absence of clinical symptoms has been marked. Luetin rarely shows that accuracy of reaction which gives its value to the von Pirquet skin test and makes it one of the best aids to diagnosis of tuberculosis in infants. The luetin test is frequently negative when heredosyphilitics have been energetically treated. The number of paradoxical Noguchi reactions is considerable. It is not proper to take into consideration a positive luetin test when clinical and serological tests are negative, while a positive Wassermann reaction at two different periods in a doubtful specific case should always aid in diagnosis. In considering the origin of certain dystrophies we should always consider the serological tests. When negative the luetin test does not exclude syphilis. The Noguchi test brings to the diagnosis of hereditary syphilis only a secondary complementary information. It is very inferior to the Wassermann.

Cause of the "Physiological" Loss of Weight of the New-born Child.—George Benestad (*Jahrbuch. f. Kinderheil.*, July, 1914) considers the possible causes of the so-called physiological loss of weight of new-born children during the first two weeks of life. The author believes that it is due to an insufficiency of metabolism especially of the hydrogen-containing materials. In this insufficiency of metabolism intestinal infection plays an important part. This loss of weight cannot be prevented, although its amount and duration is dependent on various factors, the most important of which are the degree of development and original weight of the child, and the amount of milk furnished by the mother. Artificial feeding prolongs and increases the loss of weight, since it makes the establishment of the natural metabolism more difficult. The sooner the infant is able to get accustomed to the ration the better for him, and hence the breast-fed child stands the best chance to have a small and brief loss of weight.

Acute Osteomyelitis of the Superior Maxilla in the New-born.—Aug. Broca (*Presse méd.*, July 29, 1914) describes a peculiar form of acute osteomyelitis of the superior maxilla occurring in new-born infants, believed by him to be a hematogenous infection from the passages of the mother. It begins within a few days to two weeks after birth by a swelling of the lower eye-lid extending to the suborbital region, maxillary process, and other parts of the superior maxilla. The cheek becomes phlegmonous and very tender, bloody pus runs from the nose, and the intrabuccal regions join in the swelling. The back part of the alveolar process is swollen and the hard palate enlarged. Abscesses quickly form and open, discharging pus freely. The author beleives that the inflammation begins at the follicle of a tooth which would erupt later. The author thinks that the inflammation is of hematogenous origin, with general infection, the localizing cause being unknown. It is comparable to the osteomyelitis of the long bones which is seen in infants. The infecting microbe seems often to come from the mother who has a vaginitis or a slight puerperal infection. In two of the author's cases the mother had a slight lymphangitis of the mammary gland. The prognosis is grave in these cases. In the author's ten hospital cases the mortality was 50 per cent. The severity of the septic reaction is variable: that it is a pyemia is shown by the visceral metastases seen at autopsy. The quicker treatment is undertaken the better is the prognosis. As soon as possible the alveolar border should be incised and the alveolar process at its posterior part curetted out with the tooth rudiments contained in it. The cavity need not be washed out. If the infant is breast-fed the milk should be drawn and fed to the child. Cicatrization is almost always rapid and complete and externally there is no deformity. The eruption of the first teeth is irregular since the rudiments have been removed, and even those of the second teeth may have been so that they will never appear. Even the wisdom tooth which erupts about the twentieth year depends on a tooth bulb which is formed before birth.

Generalized Emphysema.—Lucien Rivet and Paul Brodin (*Bull. gén. de thér.*, July, 1914) describes generalized emphysema as an infiltration of the tissues with air from the mediastinum, and diffused to long distances through the cellular tissues. It may occur at any age, but is especially frequent in children, which is explained by the laxity of the tissues in the mediastinum and subcutaneous tissues, and the fragility of the lungs and feeble resistance of the alveoli. Surgical emphysema may result from a fracture of the cartilages of the larynx, tracheotomy, intubation, foreign bodies in the respiratory passages, exploratory punctures of lungs and pleura. Medically it may result from two elements, a solution of continuity of the respiratory passages and respiratory efforts such as cough, and dyspnea, driving the air through a breech into the extrapulmonary spaces. The symptoms are gaseous swellings, dyspnea, etc. Whooping-cough and bronchopneumonias are especially liable to cause this complication. Ganglio-pulmonary tuberculosis is a frequent factor. An intercurrent infection causing dyspnea may be added to tuberculosis, causing rupture of the alveolar sacs. A cheesy tubercle may be subpleural; or a bronchus may ulcerate from a mediastinal gland. An old cavity may become opened into the alveoli. Swelling is very large at the base of the neck; there are superficial crepitation, coarse and fine râles within the thorax, rhythmic with the respiration or the heart beat. Death will occur soon if the case is to be fatal; if not, the air will gradually be absorbed and the tissues return to normal. In very young infants it is generally fatal. Infection is not liable to occur. Treatment is to be addressed to the causal condition. To lessen the cough hot cloths may be applied to the thorax, oxygen given, and camphorated oil injected.

Infectious Affections of the Urinary Organs in Infants.—H. L. Kowitz (*Münch. med. Woch.*, July, 1914) says that pyelonephritis in the infant is generally diagnosed cystitis, and hence is believed to be of ascending origin. Because of this mistaken diagnosis its occurrence is considered much rarer than it in reality is. The author believes it to be of hematogenous origin, and hence a descending infection, generally caused by the bacillus coli, or by the streptococcus in the blood. Between the middle of August and the end of December, 1913, the author treated seventeen boys and twenty-three girls with this affection. The pyelocystitis is generally preceded by gastrointestinal symptoms for several months. The largest number of cases occurred in July, the smallest in winter, when intestinal troubles are least frequent. Escherisch found in pure culture the bacillus coli oftenest; also the paracolon bacillus, and bacillus lactis aerogenes. In children with eczema or furunculosis the author found staphylococci, in three cases there were mixed infections of bacillus coli with saprophytes, with streptococci, and staphylococci. At first there was bacteriuria with albuminuria, and later casts and epithelium.

Bronchotetany.—E. Wieland (*Monatsschr. f. Kinderheil*, Bd. xiii., Nr. 5, 1914) describes bronchotetany as a spasm of the bronchial muscles, causing dyspnea. It is often fatal. At autopsy, in spite of a diagnosis of pneumonia, there is found no lesion of the epithelia of the lungs, or of the heart, either macroscopic or microscopic. There may be present no other symptoms of spasmophilia. Out of fifty-eight cases of spasmophilia Lederer found six of bronchial spasm. All six were fatal. There is found dulness localized over areas of atelectasis. A röntgenogram of the lungs shows no dark area as in pneumonia but a diffuse, lighter shadow of atelectasis. Differential diagnosis is made by the x-ray picture only. Therefore we find that bronchotetany shows a sharp clinical and anatomical symptom complex. The prognosis is bad. The röntgenogram combined with the symptoms and general spasmophile state of the child assist in the differential diagnosis. Light forms of pneumonia show almost identical symptoms; but their prognosis is much better.

The Less Schematic Treatment of Infants in Hospitals.—K. Stolte (*Jahrbuch. f. Kinderheil.*, Aug., 1914) discusses the undoubted fact that infants do not do as well in hospitals as they do in private houses. Hospitalism of children is a well-known fact. It is also known that infants in foundling asylums show a very large mortality. The author believes that this is the case in the best managed institutions and under the best formulæ of feeding. He thinks that if we are able better to imitate the conditions to be found in a private house and to make the feeding less stereotyped we may get better results in asylums and hospitals. He tried an experiment in this line, allowing the caretakers in the University Children's Clinic to vary the feeding a little, to give small amounts of vegetable material as would be done at home, and later to give some variety. He gives the history of the cases so treated and the excellent results obtained. There was an increase in the weight curve, an improvement of the general condition, the color, the substance of the flesh and the agility and crying ability of the children. He does not believe that it is the liability to infections that is seen in hospitals that accounts for the greater death-rate, although the management of the institutions should be improved in this direction. But the lack of the mother-love and individualizing care is responsible for much. These are of great benefit to the psychical condition of the child. We can easily demonstrate the effect that shocks have on the ability of the infant to take and digest food and to carry on good bowel action. The author cites cases in which shock in nervous children brought on attacks of diarrhea. The size of the last meal, the length of the interval, the content in fats of the feeding, all have an influence on the appetite of a child. The grown person is guided by his appetite, the infant takes what is given him. The older child sits at the table and tastes what he likes. In only a few cases of constitutional anomaly can we say that a certain quantity of milk should never be exceeded. An imitation of this less regular nourishment had a good effect on the children experimented on. Howland and Schlossman have shown that a crying child needs a larger number of calories than a quiet one.

Curability of Tuberculous Meningitis.—Johann v. Bokay (*Arch. f. Kinderheil.*, August, 1914) says that so fatal is tuberculous meningitis that a diagnosis of this disease is equivalent to a sentence of death. Nevertheless there are recorded undoubted cases of cure of this affection. Rilliet cites a case in a boy of five years of age, in which the classical symptoms of meningitis were present, but cure resulted. Five years later the child died of a second attack. Autopsy showed cheesy masses in the hemispheres with the fresh inflammation of the meninges. The author tabulates five cured cases from Dujardin-Baumetz, Barth, Thomalla, Moutardo-Martin, and Uhthoff in which the diagnosis was established by the finding of tubercles of the choroid by means of the ophthalmoscope. It is now possible to establish the diagnosis by lumbar puncture and examination of the cerebrospinal fluid and its inocculation into animals. The author has collected twenty-nine cured cases which had been examined thus and the diagnosis established, to which he adds two cases observed by himself. Of twenty-three cases, nineteen were males and four females. Ages varied from two to forty-four years. From two to twelve years there were eighteen cases cured; from sixteen to forty-four years, there were twelve. There were no cases under two years. The cases had remained cured from seven to fourteen years. These cases did not all remain permanently cured, for in one-third there was a second attack of meningitis ending in death. The author gives histories of three cases seen by him, and tabulates the twenty-nine cases collected from literature. There appears to be no doubt that we may get a cure of tuberculous meningitis when the brain alone is affected, the other organs remaining entirely or nearly normal. That tuberculosis may be primary in the brain has been demonstrated by Demme. The effect of lumbar puncture appears to be a favorable one on the course of the disease.

Prevention of Vulvovaginitis in Children.—F. J. Taussig (*Amer. Jour. Med. Sci.*, 1914, cxlviii, 480) thinks, from study of sixty-six cases of vulvovaginitis in girls of from three weeks to twelve years, that the most frequent source of infection is from child to child and that the most common manner of its transmission is through the school lavatory. As special precautions for its prevention he advises, (1) the instillation of a drop of 2 per cent. silver nitrate solution in the vestibulum vaginæ of all new-born girls whose mothers show evidence of gonorrhea, though probably not over 5 per cent. of the cases of vaginitis are infected at birth. (2) Making vaginitis in children a disease reportable to the Board of Health. (3) Instruction of parents of infected children through the visiting nurse regarding preventive measures to limit the infection, including the use of separate towels and wash-cloths, sleeping in a separate bed, care as to cleansing contaminated clothing, and special precautions in the use of the lavatory. (4) Investigation by the visiting nurse as to the probable origin of the infection in each case with a view to excluding this factor from contaminating other children in the same house. (5) The adaption of a U-shaped seat with low bowl and other precautionary measures to prevent the spread of infection through the public lavatories in schools, playgrounds, comfort-stations and tenements. Children cannot be relied upon to use paper coverings for lavatory seats, so the U-shaped seat should be used in addition. The height of the bowl should not be over eight inches where the lavatory is to be used by children of school age.

Diagnosis of Tuberculosis in Early Life.—H. R. M. Landis and I. Kaufmann (*Amer. Jour. Med. Sci.*, 1914, cxlviii, 530) say that in the diagnosis of tuberculosis in early life the symptomatology is of less value than in adults because they are unable to describe their symptoms. Little reliance can be placed on slight elevations of temperature because growing children normally have higher temperatures than adults. Physical signs differ in adults and children. In the latter the disease is bilateral, widespread and acute if the lungs are involved. In children all sounds are normally exaggerated and physical signs are often altered by faulty position or incorrect breathing. In children variations in respiratory excursion are not as significant as in adults. In considering the diagnostic value of enlarged lymph nodes it must be remembered that all children have easily palpable nodes. A positive von Pirquet reaction before two years of age usually means clinical tuberculosis. The chief facts to be decided in regard to a child are whether it is physiologically normal, and if not what is the cause. Whatever the latter may be we should endeavor to correct the child's surroundings and mode of life.

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ORIGINAL COMMUNICATIONS

A CONTRIBUTION TO THE STUDY OF MOVABLE RETRODISPLACEMENTS OF THE UTERUS.

BY

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(With seven illustrations.)

There is recorded in the early history of modern gynecology the fall from horseback of a woman whose suffering in the pelvic region immediately after her fall was so acute as to demand assistance at once. The astute and ingenious Sims, who attended, not only recognized the cause of the patient's distress, namely, an acute retrodisplacement of the uterus, but relieved her immediately. By digital manipulation per vaginam he forced the body of the uterus out of Douglas' culdesac, and in so doing permitted the entrance of air into the vagina. The action of atmospheric pressure and gravity through the position he made her assume, forced the fundus upward and forward to an anterior position, where it remained. It is of interest to note in passing, the important part this incident played in the development of gynecology, for during the process of manipulation there was revealed to Sims, by the distention of the vaginal canal, the surgical accessibility of the genital tract. The problem of approach for investigation and repair of these organs was solved, and the foundation of modern gynecology laid.

While retrodisplacements of the uterus do not, strictly speaking, constitute ptosis of the organ, they do constitute collectively the first stage in the evolution of uterine prolapse and may for convenience be grouped according to Rövsing's classification of coloptosis into the virginal and maternal types. The virginal type is found chiefly in the nullipara and while it may have associated with it, as an element in causation, faulty development in one or more of the uterine supports, it is commonly the result of improper dress and bad habits such as tight lacing, overdistended bladder and habitual constipation. The maternal type is found in women who have borne children, and in whom, while there may also exist congenital faults, the chief factors in causation are injuries dependent upon labor.

Before we can intelligently study the etiology of retrodisplacements, we must consider the normal position of the uterus, its range of motion, supports and anatomical relationships, forces to which it is constantly subjected, as well as others to which it may be subjected. Although anteversion is taught to be the normal position of the uterus, there seems to be a diversity of impressions in the minds of students on leaving college as to a position of the uterus which may be considered the standard. Drawings of the anatomists are the results of observations on the dead, and the surgeon usually constructs his illustrations from these; but a correct idea of the normal relationships of the pelvic organs in the living can be obtained only from the living, and opportunity for the study of these relationships is best afforded during intraabdominal work directed to lesions not involving, or if so only in a minor way, the organs under consideration.

Leishman(1), writing in 1879, expresses the idea of some of the profession to-day regarding the direction of the normal axis of the virgin uterus. He states that "it is a matter of no little difficulty to determine what may be regarded as a normal axis of the uterus, and in all attempts which have been made by anatomists with this in view, it has been usual to consider the parts to be in their normal position when the bladder and rectum are each moderately distended." The opinion which is usually adopted is that ..... the axis of the uetrus is identical with the axis of the brim of the pelvis.

The elements entering into the establishment of such a standard, namely, the moderately full bladder and rectum, are too indefinite for scientific use. According to Cunningham(2), "the position occupied by the uterus in the pelvis is not always the same, as it varies to some extent with the condition of the neighboring organs. . . . The anterior surface rests against the bladder and follows the rising and falling of its superior wall as that organ becomes filled and emptied. When the bladder is empty, the long axis of the uterus points forward and upward and the organ is said to be in an anteverted position. . . . With the empty condition of the bladder, the angle formed by the axis of the vagina is that of about a right angle."

Both of these authors are practically in accord regarding what should be considered the standard position, namely, when the direction of the long axis of the uterus corresponds with the direction of the axis of the brim of the pelvis and forms with the long axis of the vagina an angle of approximately 90 degrees. In Cunningham's definition of the standard position, the uterus rests on the superior surface of an empty bladder, also it occupies a position corresponding with the axis of the brim of the pelvis. As these two positions cannot be assumed by the uterus at the same time, his definition is inaccurate and unscientific.

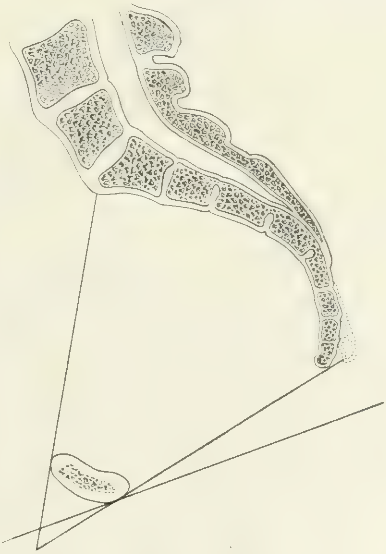

FIG. 1.—Diagrammatic cross-section showing pelvis in normal position. Plane of inlet meets the horizon at an angle of 60 degrees, that of the outlet at an angle of about 11 degrees. (After Naegele.)

To acquire a correct idea of the normal relative position of the uterus, the normal position of the bony pelvis must first be determined. This position of the pelvis, as Naegele first showed, is that of a forward inclination with the plane of the brim meeting the horizon at an angle of 60 or more degrees. Naegele also showed "that the average height of the promontory of the sacrum above the upper margin of the symphysis is about 9.5 cm., and that a line drawn from the tip of the coccyx to the lower border of the symphysis forms with the horizon an angle which varies greatly but which may be stated as averaging about 11 degrees" (Fig. 1).

The above figures are more or less constant, but the following measurements of the sagittal section of a bony pelvis are variable, though sufficiently near the average to serve the purpose at hand, namely, determining approximately the standard position of the uterus.

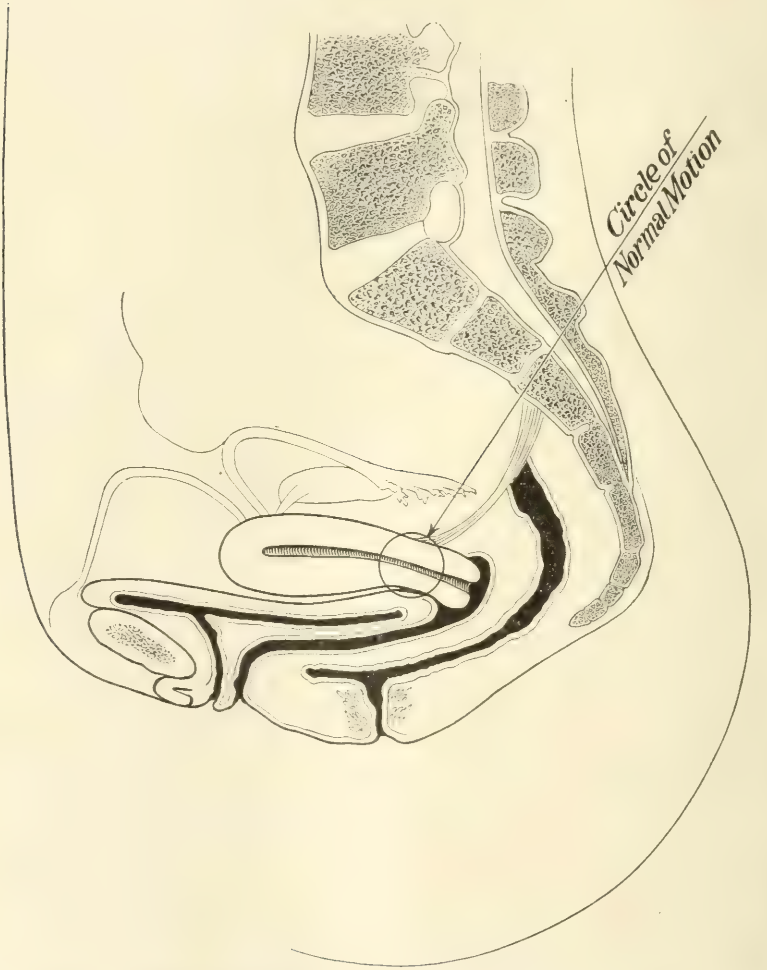

FIG. 2.—Schematic drawing showing uterus in standard position.

1. Conjugate of brim, 11.50 cm.
2. Conjugate of the cavity, 13.25+ cm.
3. Conjugate of outlet, 12.75 cm.

The angle of the vertebral column with the sacrum, 130 degrees.

From the promontory of the sacrum to the tip of the coccyx, following the curve, 14 cm.

Depth of the pubic bone, 3.75 cm.

Thickness of the pubic bone, 1.75 cm.

Angle of the symphysis with the horizon, 35 to 40 degrees.

The measurements of the soft parts used in the construction of the schematic drawing are based upon accepted authorities and upon my own examination and study of more than one hundred women who have never borne children, and whose genital organs I considered approximately normal.

Length of the uterus, 7.5 cm., cervix, 2.5 cm., corpus, 5 cm.

Anterior vaginal wall, 9.5 cm.

Posterior vaginal wall, 10.5 cm.

The direction of the first portion of the vaginal canal (1 to 1.5 cm.), patient in erect position, is directly upward, then changes in the direction of the last sacral vertebra. The general direction of the axis of the vagina, therefore, forms with the horizon an angle of about 155 degrees. The long axis of the cervical canal points to the tip of the coccyx and forms with the axis of the vagina an angle of about 45 degrees and with the horizon an angle of approximately 19 degrees. A schematic drawing (Fig. 2) constructed upon these measurements and directions, viscera empty, shows the corpus uteri resting on the upper surface of the bladder and the fundus in greater part below a plane passed from the upper surface of the symphysis to the lower margin of the third sacral vertebra.

The standard position of the bladder is the position it assumes when empty, and we are accustomed when describing its surfaces to speak of its superior and inferior surface. If the standard position of the uterus be recognized as the position it assumes when its corpus rests on the superior surface of an empty bladder, then to be logical we should describe the surfaces of the uterus we now term anterior and posterior as inferior and superior. The same is applicable to the surfaces of the vagina. In the normal nullipara there is, strictly speaking, only about 1.25 cm. of the vaginal canal, *i.e.*, that portion immediately below the pubic arch, which has an anterior and posterior surface.

The axis of rotation of the uterus is located near the meeting of the long axis of the corpus with that of the cervix. The uterus may rise or fall, move anteriorly or posteriorly, and remain within the limits of normal motion so long as its axis of rotation keeps within an imaginary circle 2 cm. more or less in diameter, the center of which is located near the intersection of the long axis of the cervix with that of the corpus when the uterus is in an extreme anterior position. The axis of rotation varies in position with every change of uterine position, but the center of the circle of normal motion remains stationary; so that when the normal anterior limits of motion are reached, that is, when the anterior surface of the corpus is in contact with the superior surface of the empty bladder, the axis of rotation is at or near the center of the circle of normal motion. When the normal posterior limits of motion are reached, that is, when the corpus approaches closely the sacrum, as under the influence of a full bladder, the axis of rotation moves posteriorly but remains within the limits of the circle. The filling of the rectum causes the rectovaginal septum to be forced up against the vesicovaginal septum with the resulting elevation of the entire uterus but not beyond its normal range of motion. Under the influence of force from above, as the result of coughing, sneezing and so forth, the axis of rotation will move downward, but not beyond the limits of the circle in this direction, nor will it under the influence of gravity alone, when the patient assumes the knee-chest position, exceed the limits of the circle of normal motion. The uterus can be pulled down to the introitus or forced up by atmospheric distention of the vagina close to the promontory of the sacrum without injury, as the axis of rotation under these circumstances is but temporarily beyond the limits of the circle of normal motion; but when the uterus is completely retrodisplaced, the axis of rotation is located forward, low and permanently beyond the circle of normal motion.

The uterus is supported and maintained in its central pelvic position chiefly by the fibrous connective and nonstriated muscular tissues which completely encircle the lower segment about the junction of the corpus and cervix. These tissues radiating in all directions are connected directly and indirectly with the surrounding bony framework, and constitute what is known as the pelvic fascial diaphragm. This fascial diaphragm is the first and chief barrier to the descent of the uterus, while the muscular floor of the pelvis constitutes the second line of defense, and enters only indirectly into the support of the uterus and maintenance of its normal position. This diaphragm may be divided into three groups of tissues, and in addition to their common function of suspending the uterus, each group possesses an individual action. The tissues radiating posteriorly limit the forward excursions of the lower uterine segment. Those radiating anteriorly blend with the base of the bladder and anterior vaginal wall and limit the posterior excursion of the lower uterine segment, while those radiating laterally limit the lateral motion of the lower segment and the descent of the entire organ.

Another important feature in the maintenance of the normal position of the uterus is the tonicity or erectile power of the uterine tissues themselves and any pathological lesion interfering with this function may be an element in the causation of malpositions. In an erect or standing posture gravity and intraabdominal pressure are factors acting conjointly in maintaining a forward position of the corpus uteri, but the uterus can maintain a forward position independent of either, as is evident on opening the abdomen when the viscera are empty and normal pelvic relationships of the uterus and adnexæ exist. Under these circumstances the anterior position of the uterus will differ from that assumed when the abdomen is closed and the patient in the erect posture, only in degree. In the former there is an appreciable space between the bladder and the corpus, in the latter the bladder and the corpus are in apposition. In the dorsal position gravity influences the corpus uteri in the direction of the sacrum, while the intraabdominal pressure which is exerted on the posterior uterine surface influences it in the direction of the symphysis. With the uterus in extreme anteverted position, there is interposed between it and the anterior vaginal wall only the superior and inferior surfaces of the bladder. As these surfaces are comparatively thin, even when contracted, the amount of space they together occupy is almost inconsiderable. Under these conditions the fundus is almost completely hidden by the symphysis and the corpus is surrounded by the horizontal rami of the pubes. This anteverted position can be determined best in a living, thin, nulliparous woman when standing, and constitutes the standard.

A slight variation from the standard exists when the patient is in a dorsal position, but the hand over the pubes may by pressure on the posterior surface of the uterus easily force the corpus into an extreme anterior position which is appreciated by the finger in the vagina. If now a finger of the free hand be pressed against the soft parts about the tip of the coccyx, and the finger in the vagina be pressed against the tissues posterior to the cervix, it will be found that the finger tips are practically on the same plane, so that the long axis of the cervical canal points to the tip of the coccyx, making the general direction of the long axis of the uterus conform to a line drawn from a point a little above the upper border of the symphysis to the tip of the coccyx.

When the bladder is filling, the body of the uterus first rises and then recedes from this standard position. When filled the general direction of the uterus is at a right angle to the general direction of the vagina. When it is distended, and the stage causing distress to the patient is reached, the corpus uteri is forced close to the sacrum. Under these circumstances the general direction of the uterus conforms to the general direction of the sacral curve and approaches the direction of the vaginal canal. This stage of retroposition is termed retrocession. With normal tonicity of the supporting structures of the uterus this retroposition is temporary, but when this tonicity is deficient, the uterus remains in this position or advances to a further stage of retrodisplacement. So that if the uterus does not follow closely the superior surface of the bladder when that organ is emptying, a space between these organs will occur which will be immediately filled by the intestines, and intraabdominal pressure then acting upon the exposed anterior surface of the uterus forces the fundus in the direction first of the sacrum, then of the coccyx, until at last the entire body occupies Douglas' culdesac. This action has the effect of forcing the lower segment of the uterus forward and in so doing stretches the tissues which hold it in its normal position. When these tissues yield the cervix moves downward then forward until it reaches the region of the vagina in close proximity to the symphysis. This stage of retrodisplacement is termed retroversion. When further depression of the fundus occurs, causing the axis of the corpus to meet the axis of the cervix at a pronounced angle, the term retroflexion is applied.

A distended rectum elevates all structures immediately above it. When, however, a distended bladder and rectum coexist and there is superimposed a sudden increase in abdominal pressure, such as is occasioned by a fall, the forces maintaining the uterus within its normal range of motion may be so disturbed as to cause complete and permanent retrodisplacement of the organ. When a displacement occurs under these circumstances it will be impossible to replace the corpus until the bladder is empty, and most difficult if the rectum is not likewise evacuated.

Opportunity is afforded to determine the extent of the influence of the round ligaments on the position of the uterus whenever the abdomen is opened for the simpler forms of intraabdominal work. If the bladder is empty and the uterus anteposed the ligaments will be found relaxed. To determine their influence upon the position of the organ these ligaments may be severed and it will be found that the corpus will not materially change its position. Previous to severing these ligaments their action may be further studied by mechanically forcing the fundus toward the sacrum. If we now inject into the bladder ten or more ounces of sterile solution it will be seen that the middle superior surface of the bladder is supported by the round ligaments. So it can be stated dogmatically that the round ligaments, *per se*, are not normally factors in maintaining the body of the uterus in an extreme anteverted position, nor are they called into action to limit the posterior movements of the body until the fundus has receded to a considerable degree. The uterosacral ligaments likewise are not, *per se*, normally factors in maintaining the cervix in a posterior position. They merely assist in limiting the anterior motion. Though normally neither of these sets of ligaments act in maintaining their respective sections in standard positions, they may be surgically utilized, as will be seen when describing the surgical treatment of retrodisplacements, to assist in accomplishing this purpose. The round and broad ligaments act conjointly with the corpus uteri to form a supporting wall to the posterior and middle area of the superior surface of the bladder when that organ is filled or distended, and conform to the shape of this portion of the bladder and approach closely the lateral walls of the pelvis when so acted upon. Under these circumstances there results a tension of these ligaments which serves to maintain the corpus in the middle line as it recedes. In the early stages of evacuating a distended bladder, the round and broad ligaments assist materially in the forward motion of the corpus and when they cease to influence the motion in this direction, intraabdominal pressure on the posterior surface of the uterus takes its place and assists in the complete restoration of the organ.

SUMMARY.

The ability of the pelvic fascial diaphragm to restore and maintain the uterus in the extreme anterior or horizontal position is the key to the situation.

So long as the uterus is in the standard position all forces directed from above upon it and its adjacent structures, are shared equally by the group of tissues constituting the fascial diaphragm, but as the corpus recedes the distribution of the forces becomes more and more unequal and the liability to permanent loss of equilibrium is greater and greater. Nature has provided the round, broad and uterosacral ligaments as additional safeguards to be called upon when the loss of equilibrium is threatened.

Any factor or combination of factors, congenital or acquired, which discourages the resumption or maintenance of the uterus in standard position, encourages an unequal distribution of the forces expended on the fascial diaphragm with retrodisplacement as the eventual result.

EXPLANATION OF SKIAGRAPHS.

Fig. 3 shows a nullipara with normal genitalia and viscera empty, in whose uterus was inserted a slightly curved, solid metal rod 0.2 cm. in diameter and 6.5 cm. in length. At one end of the rod was fastened a lead button which covered the vaginal portion of the cervix when the rod was in position. A lead strip 10.5 cm. long, 0.2 cm. in thickness and slightly curved at one end was inserted in

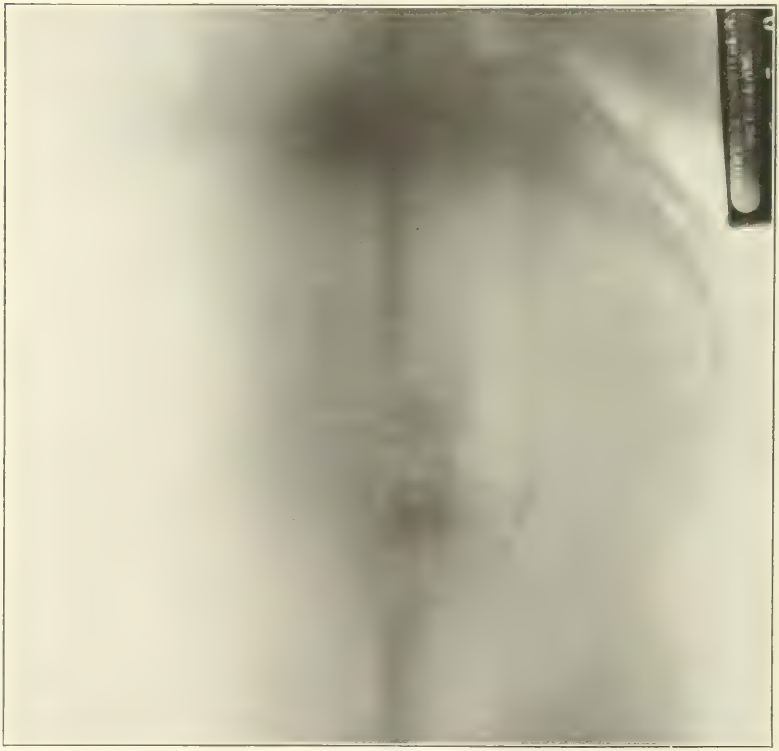

FIG. 3.—Skiagraph showing extreme anterior position of the uterus in a nullipara, in the erect posture with viscera empty, with metal stem (*a*) in uterine canal and a lead strip; (*b*) laid along the axis of the vagina.

the vagina. The picture was taken with the patient in the erect position and gives us an approximate if not an exact idea of the general direction of the genital canal from the vaginal orifice to the vault of the uterine cavity. The general direction of the vagina as here shown is as near correct I believe as can be secured and by it we are enabled to determine the exact angle it forms with the horizon, namely, 144 degrees. The direction of the uterine canal is equally well defined, but it must be noted that at the moment this picture was taken the patient began to suffer severely with uterine cramps, due to the presence of the hard and heavy metal stem in the canal. On removing the instruments after the picture was taken it was found that the vaginal strip had remained where placed but the uterine stem had been expelled 1 cm. more or less from the uterine canal (this is corroborated by the *x*-ray), the lead button having receded considerably from the vaginal strip with which it had been previously in close relationship. When the stem was forced out of the uterine canal the button was forced against the posterior vaginal wall, which in turn assisted by the weight of the instrument

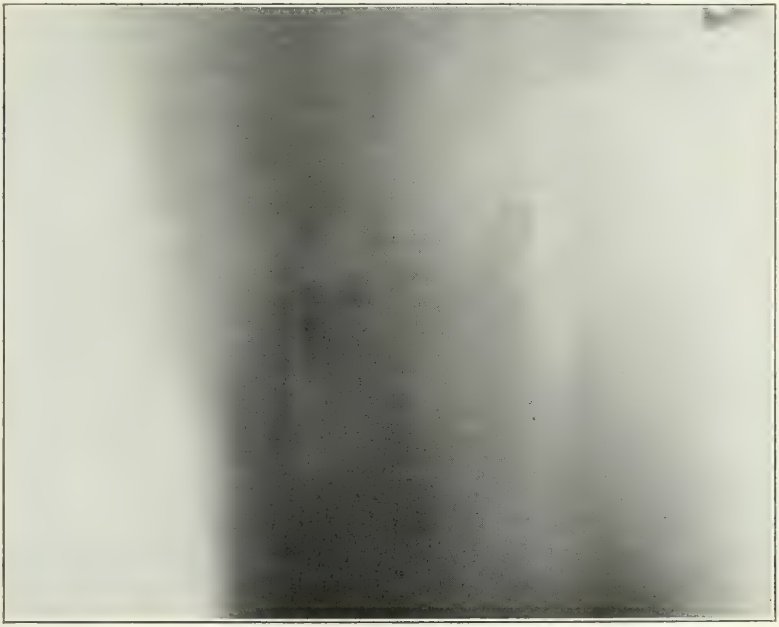

FIG. 4.—Skiagraph of same patient in erect posture, showing mercury filled catheter in uterine canal and Emmet's retroversion pessary in vagina.

directed the button forward and downward and the portion of the stem in the cavity of the uterus upward, thereby changing slightly the direction which the stem originally occupied. The angle here formed by the general direction of the long axis of the uterus with that of the vagina is about 55 degrees and with the horizon 18 degrees.

Fig. 4 is a photograph of the same patient taken a few weeks later. Instead of the hard metal uterine stem, 6.5 cm. of a small rubber catheter 0.3 cm. in diameter was used. The canal, 0.1 cm. in diameter and 5.5 cm. in length, was filled with mercury and sealed with rubber paste at both ends. The patient was an ideal subject for study, being very thin, with normal genitalia. As I wished to procure a picture of a pessary in position, and she refused to allow another *x*-ray to be taken, fearing possible injury, I substituted for the vaginal lead strip previously used, an Emmet pessary covered with tin foil. The pessary was 7.8 cm. in length or 1 cm. shorter than the anterior vaginal wall. The thickness of each bar was 0.9 cm. No uterine cramps occurred during the taking of this picture and the instruments on their removal were found where originally placed. The angle formed in this picture by the general direction of the long axis of the uterus with the previously established direction of the vagina is about 53 degrees and with the horizon 15 degrees. As

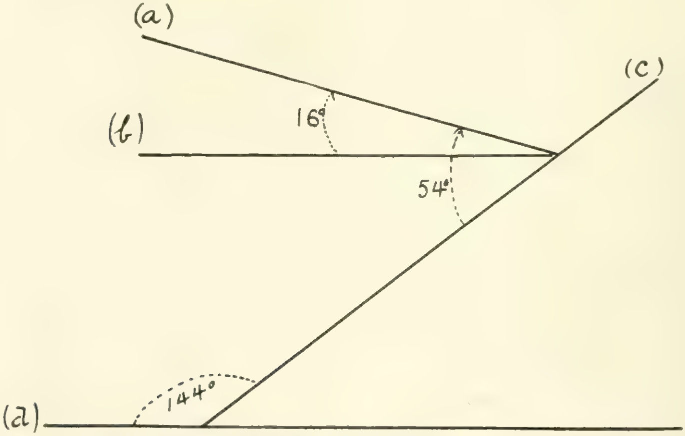

Fig. 5.—Composite diagrammatic representation of *x*-rays in Figs. 3 and 4. *a*. Direction of the long axis of the uterus. *b*. Horizon. *c*. General direction of the vagina. *d*. Horizon. When the uterus is the standard position, its long axis forms an angle with the horizon of less than 20 degrees, and an angle of less than 55 degrees with the general direction of the vagina.

it is probable that the pessary prevented a slight descent of the cervix, the angle formed by the long axis of the uterus when the patient is in the erect posture with that of the vagina must be about 54 degrees and the angle formed with the horizon about 16 degrees. So that the general direction of the uterine canal with the patient in the erect position (viscera empty) forms an angle of less than 20 degrees with the horizon and therefore for all practical purposes the uterus may be considered horizontal when in the standard position.

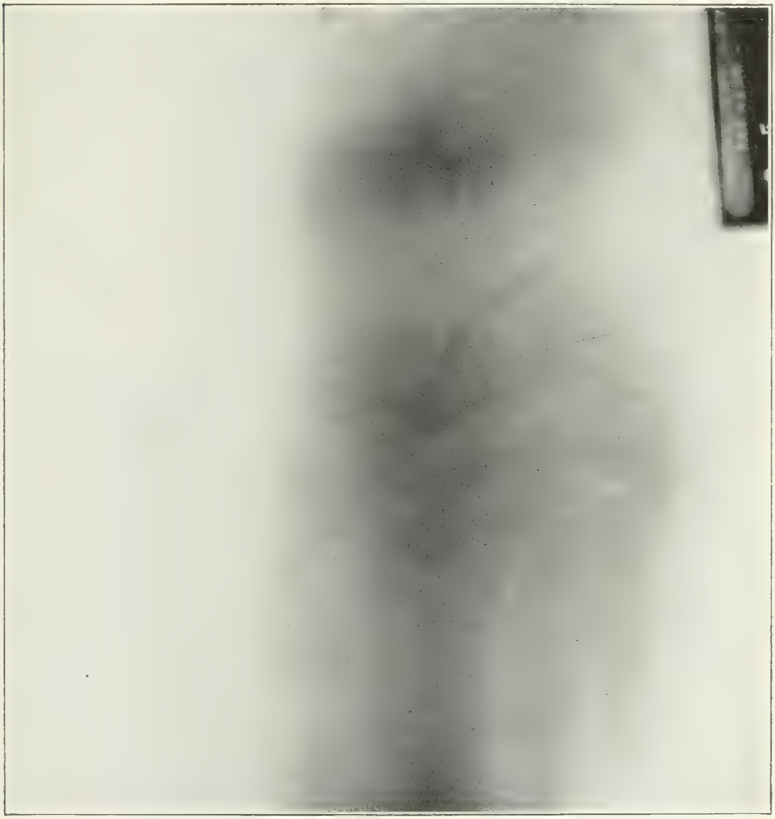

FIG. 6.—Skiagraph of a retroposed uterus in a multipara in the erect posture, metal stem in uterus, lead strip in vagina.

The schematic drawing (Fig. 2) of the relative positions of the pelvic organs in a normal nulliparous woman was made five or more years ago from observations and studies on the living. The x-rays were taken in February, 1914, and on close examination are found to correspond closely with the schematic drawing. It is difficult to procure patients who fulfil all the requirements in making *x*-ray studies of the positions of the uterus. The bony structure in the pelvic region is dense, so that in order for a shadow in the uterine cavity to be procured, not only must the substance in the canal be of much greater density but the flesh covering the bones must be the least possible in amount.

Fig. 6 gives a good idea of the uterus when that organ is in a stage of retroposition approaching the second degree. The second degree of retroposition would show the fundus uteri in the hollow of the sacrum. The third degree, or that of retroflexion, would show a distinctly curved uterine canal with the fundus uteri in the direction of the coccyx, while a plane passed along the lower surface of the body of the uterus would pass through the tip of the coccyx.

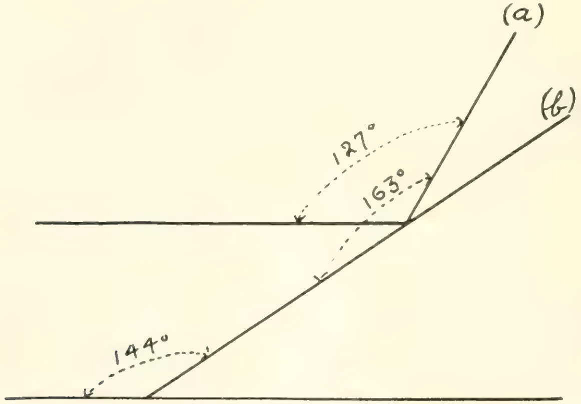

FIG. 7.—Explanatory of Fig. 6. *a*. Direction of the long axis of the retroposed uterus shown in figure. *b*. General direction of the vagina.

In Fig. 6 the long axis or general direction of this retroposed uterus forms an angle with the horizon of 127 degrees and as the general direction of the vagina forms an angle of 144 degrees with the horizon, as shown by Fig. 3, the general direction of the uterus in this case forms an angle of 163 degrees with the general direction of the vagina. In the second degree of retrodisplacement the general direction of the uterine canal would more closely approach the established direction of the vaginal canal. In the third degree the long axis of the cervix would remain continuous with that of the vagina and the axis of the corpus would meet it at a pronounced angle. The change of position of the cervix in retroposition should be noted. Normally, the external os is about 8.5 cm. from the meatus urinarius; in retroposition it approaches the meatus to within 4 to 4.5 cm. I have made several efforts to secure photographs of the second and third degree of retroposition but without success.

219 West Seventy-ninth Street.

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THE RÔLE OF THE PELVIC FASCIA AS A UTERINE SUPPORT.*

BY

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Boston, Mass.

(With five illustrations.)

So much has been written upon the fact and theory of uterine support that it would appear as though nothing remained to be added. Yet it has seemed to me that the truth lies in a somewhat different conception of the anatomy of the female pelvis from that most commonly held. My study of this subject has extended over about nine years, and has been both clinical and anatomical in character. My clinical studies have been made at the Boston City Hospital and in private practice; my anatomical work at the Tufts College Medical School by courtesy of Professor H. H. Germain.

At first sight it would seem that the question of uterine support could be easily settled by the anatomist in the dissecting room, but in point of fact such is not the case. The problem is in large part one of mechanics. Allowance must be made for discrepancies between the anatomy of the living and the anatomy of the dead, and the truth can be reached only by the correlation of clinical and anatomical observations.

Text-books of anatomy are almost uniformly weak in their description of the female pelvis. An exception is Cunningham(1).

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* Read by invitation before the Obstetrical Society of Boston, December 22, 1914.

The best article on this subject in any book is to be found in Webster's "Text-book of Diseases of Women"(2). Reference must be made to the monumental work of Halban and Tandler(3) on the "Anatomy and Etiology of Genital Prolapse." Their work, although marvellously thorough, is faulty in that they do not attach sufficient importance to the pelvic fascia. Fasciæ never show their true worth in sections, and in their dissections, seem to have been largely ignored.

CLINICAL OBSERVATIONS.

From close observation of a large number of patients suffering from lacerations and loss of support incident upon injuries received at parturition, certain well substantiated facts are apparent.

The first of these is that the perineum and levator ani have relatively little to do with the support of the uterus. This conclusion follows upon the observation that the uterus lies at a distinctly higher plane in the pelvis than the perineum and levator ani. It is borne out by three facts: first, that prolapse and procidentia may occur in women with unlacerated perineum and levator ani, and even, though rarely, in virgins; second, by the temporary prolapse which not infrequently follows upon delivery, often without perineal tear; and finally, that larger rectoceles and complete perineal tears may exist without prolapse of the uterus or bladder.

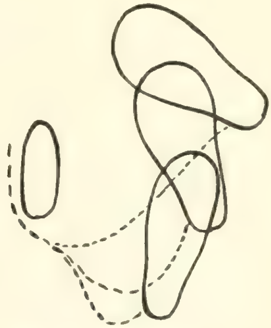

FIG. 1.—Mechanism of descent of uterus.

That the external perineum has little to do with the support of the rectum and posterior vaginal wall is shown by the fact that complete tears are not necessarily accompanied by rectocele. On the other hand, rectocele is always associated with injury to the levator ani. Therefore the function of the levator ani seems to be the support of the rectum and posterior vaginal wall. Rectocele may occur when the levator is injured, even though the external perineum remains intact.

The support of the uterus and bladder is intimately related, as is shown by the fact that prolapse of the uterus is always associated with prolapse of the bladder, although cystoceles of moderate size may occur from stretching of that part of the pelvic fascia forming the anterior vaginal wall without prolapse of the uterus. The mechanism of this prolapse as described by Hart(4) is as follows: first, there is a prolapse of the anterior vaginal wall accompanied by a dropping downward and forward of the cervix. As the process goes on the cystocele increases and the cervix drops lower, the fundus becoming secondarily retroverted. Finally, the anterior vaginal wall appears outside the vulva, followed by the cervix and finally by the upper part of the posterior vaginal wall.

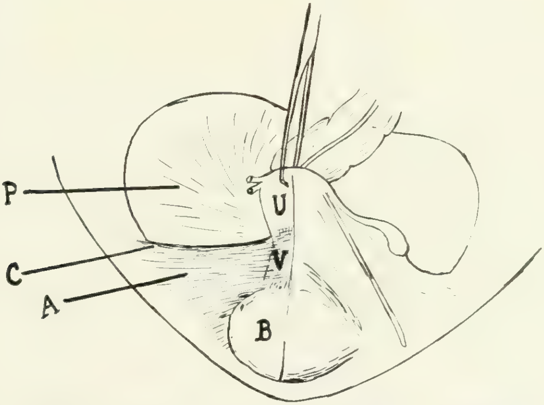

FIG. 2.—The pelvic fascia from above. U, uterus; B, bladder; A, anterior portion of pelvic fascia; P, posterior portion of pelvic fascia; C, cardinal ligament of uterus; V, vagina.

This mechanism is best observed in an early case, for later on the general laxity of the parts allows the uterus to retrovert into the hollow of the sacrum from force of gravity, which has been incorrectly assumed by many writers to be the initial stage in prolapse.

In the normal nulliparous woman, the cervix is fixed at a point high in the pelvis, the corpus being more or less movable upon the supravaginal cervix as a pivot. Now when prolapse occurs we find that the cervix is no longer relatively fixed, but on the contrary becomes equally movable with the corpus.

From this array of clinical facts two definite conclusions may be drawn.

First, that the supports of the uterus and bladder are closely connected or identical.

Second, that the uterus receives its support at the level of the supravaginal cervix.

Before describing my conception of the anatomy of the pelvis, I want to call attention to the analogy between the pelvic floor and the abdominal wall, and that between the vagina and inguinal canal. The abdominal wall and pelvic floor are alike made up of a number of layers of muscle and fascia. They are of like importance in holding the intraabdominal structures in place. As in repairing a defect, operative or hernial, in the abdominal wall we depend chiefly on the strength of the fasciæ (aponeuroses) should we not do likewise in the repair of the pelvic floor.

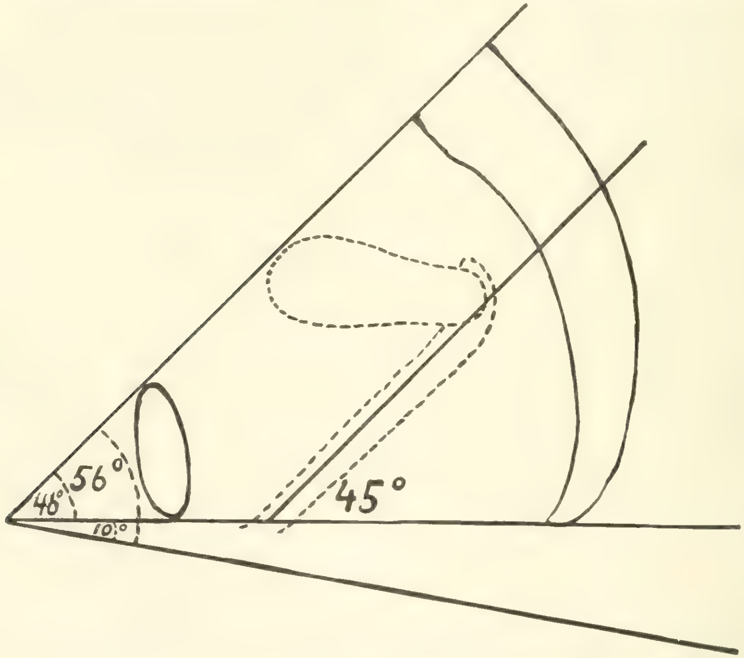

Fig. 3.—Diagram showing that axis of vagina is parallel to the superior strait.

The analogy between the vagina and inguinal canal is perhaps not so clear, since the former is a patent tube while the latter is filled in with the round ligament, areolar tissue and fat. Nevertheless both are canals passing obliquely through successive muscular and fascial layers making up the boundaries of the abdominal cavity; and a prolapse of the bladder, uterus or rectum through the vagina is now generally recognized as much a hernia as a prolapse of gut or omentum through the inguinal canal.

ANATOMY.

On removing the peritoneum from the pelvis, the pelvic fascia which lies beneath is at once exposed. The pelvic fascia is continuous above with the transversalis fascia in front, the iliac fascia laterally, and the anterior layer of the lumbar fascia behind.

Its extreme anterior portion forms the anterior true ligament of the bladder which binds the bladder and urethra firmly to the posterior surface of the os pubis.

Laterally the fascia is attached to the brim of the true pelvis, and then sweeps downward and inward to the bladder, vagina and rectum. This fascia seems to be divided into two distinct parts; one anterior, the other posterior to the broad ligaments. The portion anterior to the broad ligaments is stronger, thicker and heavier than the posterior portion. Its anteroposterior axis is parallel to that of the superior strait. From its attachment at the brim of the pelvis this portion of the fascia sweeps downward and inward to the bladder with which it is intimately connected, and to the vagina which it splits to enclose, uniting about it with the fascia from the opposite side, and being attached to the cervix uteri where it helps to form the vaginal vault.

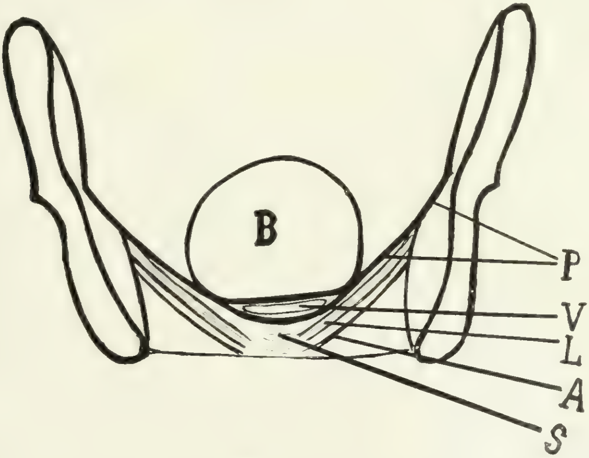

FIG. 4.—Coronal section of pelvis. P, pelvic fascia; V, vagina; L, levator ani; A, anal fascia; S, perineal body; B, bladder.

This forms a strong fibrous sling which is to my mind the main support of the bladder and vagina and the strongest of the uterine supports. To the anterior part of this fascia the name true lateral ligaments of the bladder is given by anatomists. The median portion of this fascia extending from the cervix to the symphysis pubis has been called the pubo-vesico-uterine ligament by Hyrtl (5). But in reality the whole fascia is concerned in the support of the pelvic viscera and division into ligaments is artificial and arbitrary.

At the dividing line between its anterior and posterior parts, the pelvic fascia is reinforced by a thick, somewhat fan-shaped band of fibers in which runs the uterine artery. This has received the names cardinal ligament of the uterus (Kocks(6)) and transverse ligament of the cervix (Mackenrodt(7)), and is referred to by Reynolds(8) and Dudley(9) as the fibrous base of the broad ligaments. In point of fact it is a part of the pelvic fascia and not of the broad ligament, from which it differs in structure and continuity, although it is located at the point of attachment of the broad ligament to the pelvic fascia.

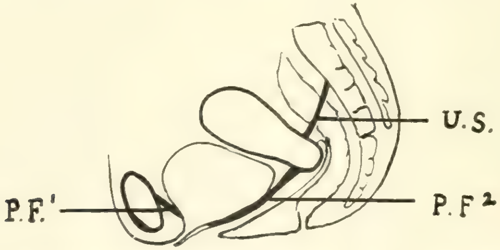

FIG. 5.—Sagittal section of pelvis. P.F¹, pelvic fascia forming anterior true ligament of bladder; P.F², pelvic fascia supporting bladder and anterior vaginal wall; U.S. utero-sacral ligaments.

The anterior portion of the pelvic fascia is intimately connected with the bladder and vagina, from which it can be separated with difficulty, and has a very firm insertion into the supravaginal cervix as is demonstrated by the difficulty with which it is divided in performing a complete hysterectomy.

The uterus and bladder, while firmly attached to the pelvic fascia, can be more easily separated from each other, being connected by a large number of small fibrous bands running in an anteroposterior direction between the two organs.

Posterior to the broad ligaments the pelvic fascia is thinner and dips more deeply into the pelvis, the whole posterior portion of the pelvis being deeper than the anterior, and passes downward and inward to the rectal wall to which it is intimately attached. Posteriorly it covers the pyriformis and is continuous above with the anterior lamella of the lumbar fascia.

From the undersurface of the pelvic fascia is given off the obturator fascia, which covers the obturator internus muscle, and the line along which this fascia separates from the pelvic fascia is much thicker than the fascia elsewhere, forming the "white line" or "*arcus teneineus*," which extends from the posterior surface of the os pubis in front to the spine of the ischium behind, and gives origin to the levator ani muscle. In all text-books of anatomy the pelvic fascia internal to the white line is called the rectovesical fascia. This name is misleading in the female, and I believe should be discarded, the whole being known simply as the pelvic fascia.

The uterosacral ligaments lie superficial to the pelvic fascia. They are rather loosely connected behind to the front of the second and third sacral vertebræ, and anteriorly are inserted into the cervix uteri at about the level of the internal os. They consist of a flat band of smooth muscle fibers (*m. retractor uteri* of Lushka) and some connective tissue, covered by a fold of peritoneum. Normally they are about 2.5 cm. in length. (Stone.)

Stone (10), who has excised and studied the uterosacrals in prolapse and retroversion, states that in such cases the length is doubled, and under the microscope there is seen to be a total absence of muscular tissue.

There is a great difference of opinion regarding the function of the uterosacral ligaments, as to whether they actually support the uterus or simply act as guy ropes to hold the cervix backward. The chief argument in favor of the uterosacrals as a support of the uterus is that the first step in prolapse is the dropping downward and forward of the cervix, together with the fact that these ligaments are found to be greatly weakened in prolapse. The greatest argument against this theory is the small size and comparative weakness of the uterosacrals.

It seems to me probable that these ligaments do have a part in holding up the uterus, and lying at a higher level than the posterior portion of the pelvic fascia, they perhaps form the posterior continuation of the sling formed anteriorly by the pelvic fascia. That they alone form the main support of the uterus does not seem possible when one compares their size and structure with that of the anterior portion of the pelvic fascia.

Of the function of the broad and round ligaments it is unnecessary to speak, since they have been generally eliminated from consideration as supports of the uterus.

The levator ani has been divided into two parts by Savage (11).

1. Pubo-coccygeus.
2. Obturator coccygeus.

The first of these, the pubo-coccygeus, arises from the posterior surface of the os pubis and passes backward about the vagina and rectum on either side to be inserted into the tip of the coccyx and the perineum. It is this portion of the muscle which may be felt in the living subject, on either side of the vagina, about 1 inch inside the introitus, and which is often lacerated in labor, resulting in rectocele.

The obturator coccygeus arises from the white line and is inserted into the sides of the coccyx, merely serving to fill in the gap between the ischium and coccyx posteriorly.

On its superior surface the pubo-coccygeus is covered by the posterior layer of the pelvic fascia about the vagina and on its inferior by the anal fascia. These two layers are continuous around the inner border of the muscle where they form a firm sheath which is readily dissected out on the living in the operation of perineorrhaphy.

The small muscles of the perineum, transversus perinei, bulbocavernosus, and ischio-cavernosus, have more to do with sphincteric action than pelvic support. The triangular ligament which lies on their deep surface, stretching across the pelvic outlet, helps to close in the lower part of the vagina by which it is perforated.

The perineal body, which forms that part of the perineum lacerated in the so-called external tears, is composed of fibrous tissue which receives the insertion of the transversus perinei, the bulbocavernosus, the external sphincter ani and some fibers of the levator ani. It forms the lower part of the posterior wall of the vagina.

I have purposely ignored the question of intraabdominal pressure, preferring to confine my paper to a comparison of the importance of the pelvic fascia with those other structures for which claim has been made as uterine supports. The chief credit for calling attention to the importance of the pelvic fascia as the main support of the uterus belongs to Webster, and although my description of the fascia and its arrangement differs somewhat from his, it is only because I have endeavored to set forth a simpler conception of the anatomy of this structure.

483 Beacon Street.

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TREATMENT OF PLACENTA PREVIA.*

BY

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For this formidable accident there is one treatment applicable to all varieties. With equal emphasis it can be said that the selection or adaptation of methods of treatment in individual cases depends less upon statistics than upon the recognition of certain well-defined and generally accepted conditions: viz., whether occurring in home or hospital practice, the condition of the mother when first seen as to the amount of blood lost; the viability of the fetus, the variety of the placenta previa, whether occurring during pregnancy or labor; the dilatability of the cervix; whether a primipara or a multipara, and, by no means least, the skill of the attendant.

Recognizing that in her home it is impossible to give the patient the full benefit of modern obstetric resources for this serious condition, it is the accepted opinion that when possible, cases of placenta previa should be placed in a well-equipped hospital. But it is also recognized that those patients remote from hospital centers are, for the most part, necessarily deprived of such facilities. For these, provision must be made for adequate help as regards physicians, nurses and supplies at the patient's home. Another truism: One may not temporize in the treatment of placenta previa. Every case requires and is entitled to receive, prompt treatment after the first

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* Part of a Symposium Read before the Medical Society of Virginia in 45th Annual Session held at Washington, D. C., Oct. 27–31, 1914.

hemorrhage with the object of emptying the uterus in the most conservative manner, as soon as the condition is diagnosed, whether it be during pregnancy or at labor. Early delivery saves more lives than any particular method of treatment, and this has to do with the viable child as much as with the mother.

I am in hearty accord with Newell of Boston, in saying that the extremely high mortality found in general practice depends not so much on the method of the delivery adopted, as on the time wasted before active measures are undertaken, and to a certain extent, on the skill of the attendant. Also with the words of the lamented Jewett of Brooklyn who said grave hemorrhage in placenta previa is due more to failure in the timely and well-directed use of the obstetric measures than to any lack of them. How often in consultation practice do we get the history of perhaps frequent recurrences of bleeding, extending possibly over several weeks, which were ignored until a copious flooding was interpreted to be the time for action. The only rare exception which might warrant delay is when the patient can be kept absolutely quiet, in a hospital where a return of the hemorrhage can be met by a prompt evacuation of the uterus; where the bleeding is slight in amount; and the child approaching viability, it may be the only child and one greatly desired.

After labor has started, whether it be spontaneous or induced, the physician should remain in constant attendance until delivery is completed and the patient has safely recovered from the inevitable and oftentimes serious shock. In this connection it should be remembered that patients who have lost much blood are bad subjects for chloroform.

Whatever plan of treatment is adopted four great principles must be kept in mind: (1) The acceptance of the dictum that the mother's life is more to be considered than that of the child, (2) the keeping of blood loss to the minimum, (3) the prevention of infection, (4) the making of ample provision for meeting any and all emergencies likely to arise.

Treatment Remote from Labor.—If diagnosed during pregnancy and before viability of the child the patient being either in her home or in a hospital, one should do a Braxton-Hicks' version after dilating the cervix enough to admit two fingers. On the other hand, if the child is viable and in good condition as shown by its heart sounds, the best results for both mother and child will be obtained by the use of the modified De Ribes rubber bag—for example the largest size Voorhees' bag, and internal podalic version after the bag has been expelled. As a matter of fact, however, the general practitioner is not always equipped with a set of these rubber bags and the appliances for their introduction; or, if he possesses them his experience may be limited in the use of them, or, the bags may have so deteriorated by drying and cracking as to render them unfit. In these circumstances the physician in domestic practice would better rely on Braxton-Hicks' version and slow extraction, solely in the interest of the mother. In hospital practice, however, or in the hands of an expert in the home, the large elastic bag is especially the method of choice.

Treatment During Labor.—At the time of labor, when the placenta previa is either partial or complete (central) the patient is losing blood, more or less rapidly, and the hemorrhage *must* be stopped. It she has lost much blood before the arrival of her attendant, or has suffered from repeated hemorrhages before labor set in; if the child is premature or so much weakened as to have little chance of living; or if the child is dead, a Braxton-Hicks' version followed by *slow* extraction again offers the best results for the mother. Special emphasis should be laid on the great importance of *slow* delivery. After the foot has been gently pulled down until the thigh compresses the placenta against the cervix, no further traction should be made on the leg unless some slight hemorrhage starts up. Wait for spontaneous expulsion. In the sole interest of the mother, the hips and the rest of the body must be successively pushed down as a conical plug against the placenta and the cervix *entirely by uterine contractions.* But in the excitement associated with such alarming hemorrhage, the physician is too often inclined to hasten delivery by making traction upon the child. The hemorrhage is under control and there is absolutely no need for haste. Traction on the child simply adds to the peril of the woman by producing extensive tears in soft and highly vascularized tissues, possibly far into the lower uterine segment. To repeat: leave the child in this condition to spontaneous delivery until the cervix has been *fully* dilated. Extract then and not before. While waiting for dilation, treat shock by appropriate remedies, and help the patient to recover from the effects of her initial hemorrhage at the beginning of labor. (Do not put saline in the rectum, however, for reasons that are obvious.)

In those cases of marginal as well as lateral insertion, with a partial dilatation of the cervix and attended by slight bleeding (the latter, for the most part, not showing itself until the second stage), puncturing the membranes is sufficient usually to stop the hemorrhage. The placenta is then permitted to recede with the retraction of the lower uterine segment while the head comes down and presses against that part of the placenta which has been separated. These varieties of course are counted, as the mildest forms of previa, and are the easiest managed.

A word or two in reference to the technic of bag dilatation. Shall the bag be placed intraovular or extraovular? A few obstetricians favor the latter method. My custom is to place the bag intraovular with a special forceps for the purpose. When placed within the amniotic sac, pressure is made directly on the fetal surface of the placenta forcing it back into its place, thereby controlling hemorrhage and effecting dilatation at the same time. When placed outside the unbroken sac the latter is lifted up by the expanded bag which naturally increases the separation of the placenta and increases also the hemorrhage. This additional separation of the placenta interferes with the fetal circulation, and oxygenation, and likewise hastens the death of the child. In advocating the intraovular method I am in accordance with the majority of obstetricians, and I believe that the objections offered by the advocates of the extraovular method are more than counterbalanced by the advantages of the one advised.

The cervical and vaginal tamponade, an old method, is only a temporary expedient; a promoter of infection; and an ineffectual bar against hemorrhage because of its tendency to push the placenta from its bed. The percentage of infection is greater in cases packed than in those treated by other methods. If used at all, only moist pledgets of cotton or gauze are employed and these must be placed through a vaginal speculum. Notwithstanding the danger of the tampon it must be admitted that it produces softening and dilatation of the cervix, and there may be times when it is the only thing available until other and more reliable treatment can be instituted. Manual dilatation is referred to only to be condemned In the opinion of the writer it has no place in placenta previa.

Cesarean Section in Placenta Previa.—Cesarean section advocated by Krönig and Sellheim for all cases of complete and partial previa, and endorsed by quite a number of American surgeons, was rejected by such American and European obstetricians as Holmes, Hirst, Ehrenfest, Schauta, Hofmeier, Ahlfeld, and others. Of late years the operation again seems to have gained favor. Some are giving it qualified approval; others more hearty endorsement. Among the former are J. Whitridge Williams, DeLee, Edgar, Cragin, Norris, Fry and others. Of the latter, in addition to Krönig, and Sellheim before mentioned, are Pankov, Zinke, Donoghue, Kerr, Lapthorn Smith, E. P. Davis, McPherson and others, in well-selected cases of course.

It cannot be denied that Cesarean section has a restricted place in complete placenta previa, and in some cases of the partial variety; but to say that all cases presenting these varieties should be treated by Cesarean section is as misleading as to claim that no case of placenta previa warrants intervention by the abdominal route. Basing my opinion on my own private and hospital experience, I believe that Cesarean section should be chosen under the following conditions: With the approach of full term; the placenta covering a great part or the whole of the os; the hemorrhage profuse but not enough to make the mother a bad surgical risk, the child probably weakened, yet offering reasonable prospects of being saved; the cervix in a condition suggestive of prolonged and difficult dilatation; a negative history of vaginal contamination; and, the assurance of hospital technic.

The following quotations will serve to show the status of this question in divergent centers of this country and abroad:

Newell, of Boston.—"In complete placenta previa, Cesarean section should be reserved for those cases in which the cervix is rigid, as occasionally observed in primiparæ, or in multiparæ with cicatricial stenosis, or patients in whom there is marked pelvic contraction."

Cragin, of New York.—"I still reserve Cesarean section for exceptional cases where the cervix is long and rigid, and the hemorrhage profuse" (personal communication).

Williams, of Baltimore.—It seems doubtful whether Cesarean section will come into general use, particularly as it is applicable to hospital patients, or to the rich who can be surrounded by convenience and safeguard; nevertheless, I am prepared to admit that Cesarean section may occasionally be the operation of choice as, for instance, when a primipara with a rigid cervix, and a living child is overtaken by profuse hemorrhage."

Nagel, of Berlin.—"Will never be practicable in routine cases." He quotes Döderlein as having curtailed its use in hospital and clinical practice based upon the following contraindications: (1) infection from the patient herself, (2) fever, (3) examination made by physicians and midwives before admission to the hospital, (4) tamponade, (5) extensive hemorrhage, (6) marginal insertion of placenta (because in this case patient can be confined in a simple manner), (7) in cases where fetus is either dead or not viable (amounting to about 50 per cent. in hospital cases of previa). This leaves few for Cesarean section.

DeLee, of Chicago.—"Cesarean section is gradually gaining reluctant recognition. Very recently the operation has begun to enjoy more, and I think just, popularity." "An indication will arise in cases of central and of partial placenta previa when pregnancy is at or near term, with a living child, the mother in good condition, the cervix being closed or promising difficulty in dilatation, conditions most common in primiparæ." "A necessary requirement is that the aseptic facilities of a good maternity can be had, or improvised at home, and a man capable of his task obtainable. The opportunities for performing the abdominal delivery with all these conditions filled will be quite rare."

Fry, of Washington.—"Advisable in central placenta previa complicated by an undilated cervical canal or one whose tissues are unprepared for artificial dilatation. This condition exists only in about 5 per cent. of all cases of placenta previa and is almost never met with in multipara."

CONCLUSIONS.

1. Before viability, both in home and hospital practice, the Braxton-Hicks' method of version is demanded.

2. After viability, provided the child is in good condition, the intraovular use of the elastic rubber bag followed by internal podalic version offers the best result for both the mother and child. In home practice, when the bag is not available, Braxton-Hicks' version again should be the treatment.

3. During labor, in complete or partial placenta previa, with great loss of blood, the child either dead or possessing little chance of living, Braxton-Hicks' version offers the best results for the mother.

4. Whenever Braxton-Hicks' version is employed it should always be followed by *slow* extraction. All efforts at rapid delivery by dragging the child through an undilated cervix will be followed by most disastrous consequences to the mother.

5. For the milder varieties of placenta previa, the marginal and lateral, simply puncturing the membranes is generally the only thing necessary to control the hemorrhage.

6. The cervical and vaginal tampon is a makeshift at best, and if at all should be used under rigid aseptic conditions and other precautions well defined.

7. Cesarean section has a restricted place in placenta previa. It should be chosen under the following conditions: with the approach of full term; the placenta covering a great part or the whole of the os; the hemorrhage profuse, but not enough to make the mother a bad surgical risk; the child probably weakened, yet offering reasonable prospects of being saved; the cervix in a condition suggestive of prolonged and difficult dilatation; a negative history of vaginal contamination; and, the assurance of hospital technic.

5 West Grace Street.

NEWER METHODS FOR THE CLINICAL EXAMINATION OF BLOOD.

BY
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University of Basel.

The medical profession is reaching a stage when the most careful and complete diagnosis is absolutely essential to professional success. Formerly the diagnosis has been practically dependent on the information elicited by the usual procedures of clinical examination, viz.: the history, the subjective and objective symptoms and the examination of the patient by palpation, percussion, auscultation and other allied methods. To-day, there is hardly a medical institution where the chemical examinations of urine and gastric juice, the bacteriological examination of sputum and the biological Wassermann and Abderhalden tests are not performed. The methods in vogue in the hospitals or the large laboratories are, however, not suited to the man who works alone. It is quite a different matter for a laboratory assistant to make a quantitative examination of 5–20 or more specimens at one time, and for a lone man to do the same work with one solitary specimen, the examination on which might be the one thing needed to assist him in arriving at the proper conclusion. It is true that an increasing number of medical men make use of the clinical laboratories now to be found in our larger cities, but these are available only to the comparatively few who live near at hand, and whose patients are able and willing to pay the laboratory fees. For the bulk of the practitioners the work must be done by themselves or their assistants as part of their daily routine. Fortunately the great improvements which have recently been made in the methods employed in the direction of simplification render this quite possible, and the medical man without any laboratory training by simply following plain and straightforward directions can make not merely a qualitative but an actual quantitative analysis of blood and urine with quite sufficient accuracy for clinical purposes.

For some considerable time I have been devoting myself to the methods of investigation in chemical physiology, and have carried out quantitative estimations of urine and blood. I have often realized that the methods advocated when great accuracy is required are unnecessarily complicated and require too much time. In this respect the methods based on colorimetry have recently established a reputation, especially when dealing with such minute quantities as cannot be estimated by the analysis of weight and mass. It was almost impossible so far for the smaller laboratory, and quite out of the question for the general practitioner, to estimate uric acid, iron, cholesterin, sugar, or even with positive accuracy the hemoglobin contained in blood.

I will describe the methods now, which are so accurate that 1/1000 of a milligram of uric acid or a trace of sugar in blood can be tested with absolute accuracy.

Uric Acid in Blood.—Two, five or still better 10 c.c. of blood are mixed with a few milligrams of ammonium oxalate to prevent coagulation, and the mixture is added to five times its volume of 10 per cent. acetic acid, and reheated to the boiling point. The mixture is filtered and the coagulum mixed again with 200 c.c. of boiling water to which 1 gram of sodium acetate has been added. After five minutes it is again filtered. The collected liquids are evaporated until the volume approximates 3 c.c. and washed twice with 2 c.c. of a 0.1 per cent. solution of lithium carbonate into the glass tube of a centrifuge. Thereafter 5 drops of a 3 per cent. silver lactate solution, 2 drops of a magnesia mixture and 10–15 drops of ammonia hydroxide are added, and the mixture is centrifuged. The clear liquid is then poured off, the residue mixed with 5 drops of sulphuretted hydrogen solution and 1 drop of concentrated hydrochloric acid. The sulphuretted hydrogen is then driven off again, immersing the tube in boiling water until a 0.5 per cent. solution of lead subacetate does not produce a cloud. Water is now added and the mixture is again centrifuged. The clear liquid is poured into the separating cylinder, the residue twice washed again with hot water, the liquids being each time poured into the separating cylinder. Two cubic centimeters of diluted sulphuric acid and 5 c.c. of chloroform are added and finally 1 c.c. of 10 per cent. hydro-iodic acid, the mixture being gently shaken. The iodine liberated and dissolved in the chloroform is estimated by comparing a certain quantity with the standard solution of iodine. For the comparison it is best to use the instrument designed by Prof. Autenrieth and Prof. Koenigsberger of the University of Freiburg i/Ba., which will give a quick and most accurate result.

The liquid to be examined is placed in the little trough which forms part of the instrument and is compared with the standard wedge also fixed into the instrument. The observation is made through a small window, behind which a Helmholz double plate is fixed. This plate is the essential part of the instrument, for by it the liquids, *i.e.*, the standard and the specimen liquid, are joined and seen together so closely that the slightest difference in the colors of the liquids can be observed. The position of the trough is fixed, but by a mechanical device the standard solution, which is provided in a suitable wedge, can be moved up and down, thereby with the least movement comparing different quantities of the standard solution with, of course, varying intensities of color, before the eye of the observer. This shifting up and down is continued until the exact point is found at which the standard wedge shows identically the same color as the specimen liquid in the trough which, it must be remembered, is seen simultaneously with the standard liquid. At the same time as the wedge a scale of figures is made to travel along a pointer, so that exactly at the point where both liquids show the same color a certain figure can be read off the scale. This figure is applied to a comparison scale such as is provided with the instrument for any kind of clinical examination, which will give direct readings of the quantity contained in the specimen, thus obviating all calculations.

Iron in Blood.—From a puncture in the lobe of the ear, a few drops of blood are sucked up in a capillary pipet to the amount of 25 c.mm. The pipet is cleansed externally with a cotton wool pad, and the measured blood is allowed to flow into a clear and perfectly clean platinum basin. The pipet is then cleansed by sucking up water two or three times, which is also added to the contents of the platinum basin. The solution is evaporated to dryness. The dry residue is carefully heated over a small flame, until all the carbonaceous particles have disappeared. Five-tenths of a gram of bisulphate of potassium is added. The basin is heated, being constantly agitated, at first slightly and subsequently more briskly, until the whole of the excess of potassium bi-sulphate is decomposed, and no more vapor of sulphuric anhydride escapes. The cooled deposit is now dissolved in a little 1/2 n-hydrochloric acid with the aid of careful warming; the solution is then poured, without any loss, into a measuring cylinder (25 c.c. contents). The platinum basin is washed out two or three times with a little 1/2 n-hydrochloric acid, and these washings are also added to the measuring cylinder. The whole is diluted with 1/2 n-hydrochloric acid, until the total volume of the iron solution amounts to 6 c.c. Six cubic centimeters of the Rhodan-potassium solution are then added, as well as 10 c.c. of pure ether. The mixture is well cooled and shaken. The ether solution is poured off clear in the glass-stoppered trough, and the estimation of its colorimetric value is made by moving the graduated iron-block. The chart will then indicate the amount of iron contained in 10 c.c. of the solution, and therefore also the amount in 25 c.mm. of blood. If it is desired to ascertain the amount of iron in 100 c.c. of blood, the amount found in 25 c mm. must be multiplied by 4000. For instance, a blood examination indicated a scale value of 68 on the colorimeter; the graduated chart showed this to correspond to an iron content of 0.013 milligram. It followed therefore that in 100 c.c. of blood there were contained 0.013×4000 = 52 mgr. of iron. If the blood is evidently poor in iron, it is necessary to measure out 50 c.mm. for each colorimetric iron estimation, but otherwise the procedure is the same. Obviously, in order to ascertain the amount of iron in 100 c.c. of blood, the value then obtained must be multiplied by 2000.

Cholesterin.—Two cubic centimeters of serum or 0.1–1 c.c. of fresh or dried tissue are placed in a beaker of 100 c.c. capacity and 20 c.c. of an aqueous solution of caustic potash (25 per cent.) are added. The mixture is boiled in the water bath for 2 to 3 hours, whereupon the liquid is cooled and without being diluted is placed in a separating funnel and thoroughly shaken for a few minutes with the 2–3-fold volume of ether (about 40 c.c. ether for each shaking operation). After a deposit has been formed and the ethereal solution is separated, the shaking operation with the same quantity of ether is repeated about five times. The combined ethereal extracts are allowed to stand for a short time, whereupon the ether is filtered and distilled off. The residue, which consists of cholesterin, is dissolved in a certain quantity of chloroform and used for the colorimetric determination.

Blood or blood serum, after being boiled with caustic potash solution, can almost always be extracted directly with chloroform. The alkaline mixture is first thoroughly shaken with 25 c.c. of chloroform and then five times each with about 15 c.c. chloroform. The chloroform solution rendered turbid by water is shaken with about 10 per cent. dried sulphate of sodium, filtered and brought to 100 c.c. with chloroform. Five cubic centimeters of this solution are employed for the colorimeter determination.

Five cubic centimeters of this chloroform solution are placed in a graduated cylinder of 10 c.c. capacity, and 2 c.c. glacial acetic acid, and 0.1 c.c. concentrated, sulphuric acid are added. The cylinder is now shaken and in a dark place put into warm water of 30–35° C. for fifteen minutes. A small quantity of the green-colored solution is then poured into the cuvette of the colorimeter and the wedge is shifted until the colors become uniform. The figure read on the scale is now compared with the corresponding figure on the cholesterin curve from which the cholesterin contained in 5 c.c. chloroform can be read directly. If small quantities of cholesterin are contained, only 50 c.c. chloroform are employed for shaking, but a corresponding larger quantity is used for substances rich in cholesterin. When calculating the percentage, the dilution employed must of course be taken into consideration.

The comparative solution for the determination of cholesterin will keep for a short period of time only, we therefore supply the colorimeters with stoppered wedges which are to be filled for each test with the color liquid supplied with them.

After use this solution is to be poured back into the bottle. It is advisable to dry the wedge before filling it by cleaning with water-alcohol-ether, and to filter the standard solution in case it has gotten cloudy by long use.

The various methods of extraction and of colorimetric determination are described by Autenrieth-Funk in the *Münchner Medizinische Wochenschrift*, No. 25, 1913: The determination of Cholesterin in Blood and in Organs.

Sugar in Blood.—2.5 c.c. of blood are added to 25 c.c. boiling 1/100 N. acetic acid, to which 0.5 gram sod. chlorid had been added. The mixture is heated up again to the boiling-point, and filtered. The residue is washed with the 1/100 N. lot. acetic acid twice and the liquids collected and evaporated. If the dried residue should be slightly colored, it is washed with the 1/100 N. lot. acetic acid twice and the liquids collected and evaporated. If the dried residue should be slightly colored, it is washed with hot alcohol, and evaporated again. The residue, now quite colorless, is dissolved in about 20 c.c. of water. To this solution 2 grams of potassium Rhodan, 2.5 gr. potass. carbon. and 5 c.c. Bangs' solution are added, and the mixture is boiled over a wire net for three minutes. After cooling sufficient of a 10 per cent. solution of potass. Rhodan is added to make 25 c.c. in all. This solution is now compared with a normal solution by means of a colorimeter as described above. All three methods give absolute correct results. I have been able to trace 1/1000 milligram of uric acid, and found absolute exact figures when comparing the results obtained by these methods with the best recognized standard methods of quantitative analysis.

Hemoglobin in Blood.—Take 20 cubic millimeters of blood with the pipet from the patient. Then fill the trough, of 2 c.c. capacity provided with the mark, with 1/10 standard hydrochloric acid to half way up to the mentioned mark. Blow the blood from the pipet into this solution, and by careful suction and blowing get all traces of blood out of the pipet and uniformly mix the ejected blood with the hydrochloric acid. Then carefully fill up, first by means of the blood pipet, and finally with a drop pipet, with 1/10 standard hydrochloric acid exactly as far as the mark (lower meniscus). Mix it thoroughly and let it stand for five minutes.

Place the trough into the apparatus. Holding the whole at the normal visual distance (25 cm.) from the eye, and looking through the small opening of the front slide, there is neither a separating line nor an intervening space visible between the surface on the right side, which contains light which has passed through the wedge and the surface on the left having light which has gone through the trough. It is best to hold the apparatus against the sky, a light wall or a similar light surface and then screw the wedge up or down until both surfaces show perfect quality in color.

If both colors are absolutes, the quantity of hemoglobin can be ascertained by reading of the fixed (millimeters) on the scale of the slide. From the graphic curve supplied with each apparatus the percentage of hemoglobin is directly read off by fixing on the ascertained value on the narrow side of the scale (ordinates) and then proceeding to the curve in a horizontal direction. From the point where the curve intersects the horizontal lines proceed vertically as far as the longitudinal side of the table (abscissæ) and find the required value in percentage of hemoglobin. Fractions of percentage can be easily determined by reduction, since each part of the millimeter papers corresponds to a percentage of hemoglobin.

As is well known the normal hemoglobin values vary with the geographical situation and altitude of the various places of observation.

For this reason it has been omitted to provide the scale of the slide directly with the percentage figures; the percentage is taken from a graphic curve. For very exact measurements, however, a standard curve of the district should be made by personally calibrating the wedge which can be done exceedingly easily.

Gauging of the Wedge.—It is necessary that blood be taken from a healthy person having a very high percentage of hemoglobin, because this percentage arbitrarily serves as the unit and is made equal to 100 units. The appertaining scale value of the colorimeter is marked vertically above the point 100. The other points are determined as follows: take 20 cubic millimeters of blood, pour it into a small measuring cylinder and after rinsing out the pipet do not fill up to 2 c.c. but to 4 c.c. If there were 100 units previously in 2 c.c., as the quantity of coloring matter in the blood is distributed among 4 instead of 2 c.c., there are now only 50 units in 2 c.c. of this solution. The appertaining scale value is marked vertically above 50. The other points are obtained in exactly the same way.

100 units hemoglobin correspond to the dilution to 2 c.c.
50 units hemoglobin correspond to the dilution to 4 c.c.
40 units hemoglobin correspond to the dilution to 5 c.c.
25 units hemoglobin correspond to the dilution to 8 c.c.
20 units hemoglobin correspond to the dilution to 10 c.c.

The scale values are ascertained from six readings. When properly calibrated all the points lie in one line.

SACROILIAC STRAIN.*

BY

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Among the more recent developments in the field of medicine and surgery, relaxation of one or both of the sacroiliac joints is of interest, or, as it might be better put; the discovery of the fact that such a relaxation could produce a set of symptoms as is seen in individuals suffering from this cause. Backache any where from the pelvis to the neck is a common symptom and one produced by a variety of causes; sciatica is also a common source of distress and has its various causes. Pains in feet, calf of leg and thigh other than sciatica are common plaints. Add to these the nervous phenomena attendant upon a constant irritation such as we have in these cases and a wide field is presented over which affections of the sacroiliac joints may, and, as I shall endeavor to show, do have an influence. With such diverse symptoms it is little wonder, that medical men were long finding just what was the source of the irritation, even though it was long appreciated that pregnancy and parturition sometimes affected these parts severely.

Before proceeding further a review of the anatomy of these joints will be useful. It was formerly held that they were of the fixed type synchondroses; that in nature they were held rigid and immovable except in association with pregnancy when a physiological relaxation occurred. This is now known to be untrue as proven by the experiments of Drs. Goldthwait and Osgood of Boston, made by them on bodies at autopsy immediately following death.

The joint is of the movable type with the bearing surfaces per-

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* Read before the Washington Obstetrical and Gynecological Society.

fectly smooth and containing a true synovial sac; held in articulation simply by means of ligaments which are numerous and strong. There is no bony interlocking as in the vertebral, no irregularities as found in other joints. The ligamentous union is by the anterior and posterior sacroiliacs, the anterior and posterior common, lumbosacral and iliolumbar ligaments.

The muscular attachments which may have a bearing on disturbances in the joint are above, quadratus lumborum, erector spinæ, transversalis abdominis, latissimus dorsæ, external and internal oblique and the gluteal groups. Below we have the quadriceps, semitendinosis and semimembranosis, the adductor and abductor groups. It is well to note in passing that these muscles are the largest and most powerful of the body; that they perform their functions with one point of traction on the ilia which articulate with the sacrum as above described.

Given then, a true joint, it must be susceptible to the common injuries of such joints and, in fact, is, even to dislocation. When its formation is taken into consideration together with the part it plays in bodily activities it is little wonder that many injuries occur.

The enervation of this region is largely from the sacral plexus which is formed by a junction of the lumbosacral cord, the anterior divisions of the three upper sacral nerves and of the fourth. The principal branches are: Muscular, superior gluteal, inferior gluteal, pudic, great sciatic and lesser sciatic.

These supply the muscles of the pelvis and lower extremities with branches to the rectum, bladder, urethra, uterus and labia, thus explaining spasms in these organs associated with sacroiliac trouble. That part of the sacral plexus, the lumbosacral cord, to which irritation occurs in relaxation of the joints, passes over the brim of the pelvis at the sacroiliac articulation. Hence the symptoms largely occur in those muscles which receive their branches from this plexus. The irritation to muscles above, such as the erector spinæ and latissimus dorsæ, I am unable to explain except it be by communicating branches or through the sympathetic nervous system.

The physiology of these articulations cannot be better described than they are in the paper by Drs. Goldthwait and Osgood as follows: "The joints are so formed as to permit motion in certain directions and such motions tend to lessen jars and strains. Also that such motions tend to increase or modify the diameters of the pelvis. These movements are on a transverse axis with a center at the lower portion of the articulation between the ilium through the second sacral vertebra or at about the middle of the body of the sacrum. Because of the arrangement of the ligaments and the shape of the surfaces of bone forming the articulation, the movements of the sacrum must be backward at the top and forward at the tip or the reverse unless there be extreme relaxation. This may be developed by moving sacrum on ilium or ilium on sacrum. If the upper part of the sacrum is moved backward, the anteroposterior diameter at the brim is consequently increased, at the same time the tip is moved forward and the anteroposterior diameter of outlet is reduced. Reverse this and conditions reverse. As movements are studied still further it will be seen that because of the obliquity of the articular planes when the upper portion of the sacrum is drawn back, the iliac bones are necessarily separated so that the lateral diameter at the brim is widened while at the outlet the diameter is narrowed." Force is given to these facts by observation of cases, in which, after careful measurement the pelvic diameters are found to be short and a difficult labor is expected, only to see these cases fall in labor and be delivered with comparative ease.

Walcher in 1889 stated that the diagonal conjugate varied on an average of 1 centimeter.

Kutner in 1898 demonstrated a difference of 1 to 1.4 centimeters between the lithotomy and hanging positions.

We have then to deal with a part of the body which has a normal as well as pathological interest to us. One which, while by no means confined to pregnant and parturient women, is very closely associated with these conditions. We may go even further than this and show that movements in these joints are increased by menstruation. Whether this be due to a general pelvic hyperemia or not remains to be proven.

Generally speaking the causes of relaxation may be divided into physiological, as pregnancy, or traumatic, as difficult labor, or direct falls on buttocks. The factors largely responsible for the condition in pregnancy and the puerperium are a serous infiltration of joint structure, making them softer, spongy, and larger. The increase in size and contents of the synovial sac tends to separate the bones, thus making their movements freer. Methods of dress such as the use of a corset which constricts at the waist, making undue pressure on the crests of the ilia, tend to force apart the lower portions of the bones by putting an unequal strain on the joints. The awkardness of the individual in the latter months of pregnancy predisposes to accidents. During parturition the passage of a large head either by the individual's own efforts or by forcible delivery of any sort may injure the joint. In the puerperium, where we have lingering the results of pregnancy and parturition coupled with greater activity on the part of the individual, a sudden or too strenuous task may sprain the joints.

The clinical pictures presented in cases of sacroiliac strain are not always clearly defined. Locally, pain in the back is the one symptom common to most cases. This may be so slight that its effect is largely shown in the disposition, as the patient is suffering from a continuous irritation, or it may so completely disable as to prevent getting out of bed. Beginning with a slight relaxation there is an increase of pain and disability as the arc of motion in the joint increases. In an incipient case there will be complaint following any movement requiring use of the lower spinal or sacral muscles, as a sitting posture, stooping, or any condition in which a relaxation occurs. Frequently patients will complain that on waking from sleep after a night's rest, the lower part of the back aches, which can be relieved only by lying on the back or by placing a pillow at the back or by getting up and stretching or otherwise getting the joints in proper relation. Sleeping with too high a pillow or with no pillow may cause a strain producing the same condition. At other times, instead of giving relief, any attempt to change position on waking causes exquisite pain and at times complete inability to even make the attempt. This loss of power of movement is illustrated in Case II. Referred pains are caused by irritation of the lumbosacral cord and consist of tiring, aching and rigidity of certain muscles or groups of muscles receiving branches from the sacral plexus. These conditions are brought about both by a protective action on the part of the muscles and direct nerve irritation.

Objectively, symptoms of pain and tenderness can usually be elicited by deep pressure over the joint; movements of the joint; rocking or compressing the ilia; by flexing the leg with knee extended while with the knee flexed no discomfort is felt.

Many pregnant women have symptoms which, while not severe, are yet sufficient to make them miserable. In fact, many of them have the idea that the pregnant state is attended by a certain amount of pain and discomfort which must be borne, and so bear in quiet rather severe pain from sacral iliac relaxation which could almost certainly be relieved by the medical attendant if he but knew of the condition and realized the efficacy of treatment.

Prognosis in so far as relief is concerned is good at all times. In cases occurring in nulliparous women and rendered acute at each menstrual period, and in cases occurring or continuing postpartum, a cure or complete relief can usually be promised. In pregnant cases a cure need not be expected until after parturition. In all cases the general condition, station in life and mental poise of patient must be carefully weighed and due notice given that treatment does not always immediately relieve conditions and that an absolute cure may not be effected for months or years, even though proper treatment be instituted.

Treatment consists primarily of fixation of the joints. Rest is of valuable assistance yet, if rest alone is used, we will be chagrined to find our patient getting up from bed after a week or so of apparent recuperation only to find symptoms returning immediately or shortly after assuming erect posture. Massage over joints and muscles affected is of great assistance as is also the application of heat.

The plan I have always worked upon and which has given uniformly beneficial results is first to apply a dressing of adhesive plaster. The adhesive plaster is torn into strips of about 2 inches in width and length to be determined by size of patient. It should be long enough to reach from just posterior to the anteroposterior median line about on a level with the iliac crest, downward across back to just posterior to the opposite anteroposterior median line at a level of the great trochanter of the femur. It is important that the strips do not extend anterior to the anteroposterior median line for the reason that great discomfort is attendant upon the drawing action across the abdomen. In applying strips, have patient in prone position on flat, hard bed. Securely attach one end, either having patient place hand on it or have assistant hold it, then grasp free end with right hand pulling forcibly making counterpressure with left hand against ilium at same time bringing free end of plaster in contact with skin. This is done alternately from side to side each strip overlapping the preceding by one-half. When finished, we have a dressing spreading fan-wise on each side and converging over the sacroiliac joints. This fan-shape gives the greatest area of traction possible and holds the joints stiff, preventing the excess motion which is the cause of the disturbance. The uses of this dressing are threefold: First, it gives relief from pain and permits patient to go about. Second, it acts in many of the cases of lesser severity as a curative agent. Third, it is a valuable diagnostic measure. On account of the irritability of the skin, in some cases, it is not practicable to renew this strapping. In others it may be renewed sufficiently to effect a cure. When patient is relieved from pain and disability by such a dressing the diagnosis is clear and arrangements should be made for a permanent dressing of one of the following sorts. The most common is the sacroiliac belt, made to measure of patient, 3 inches in width, either of sole leather lined with kid or of webbing, and worn round the hips midway between the iliac crests and great trochanters of femur with perineal straps to keep belt from riding up. A corset belt is sometimes used. In this dressing the belt is built on the loweredge of the corset, otherwise it is similar to the simple belt. A stockinet or elastic pair of trunks is sometimes used and in some cases is all that is needed. In the more severe cases postpartum, a plaster-of-Paris dressing is sometimes used with great benefit. In any of the above dressings an auxiliary pad 1 or 2 inches thick conforming to the size and general shape of the sacrum is placed inside the belt just over the sacrum. This acts by making pressure on the sacrum when the position of that bone is displaced backward and forcing it forward into its proper position.

In a series of 193 cases approximately 20 per cent. were associated with pregnancy. Out of these I have chosen four cases for reporting as illustrating the functional disorders of this joint.

CASE I.—Miss P. Aged twenty-nine, unmarried, suffered severely at each menstrual flow with pains in her back and calf of the leg. The latter was thought to be due to relaxed arches. Support under arches failed to give relief. Examination of sacroiliac joints showed them to be very sensitive and a diagnosis of relaxation was made. After application of adhesive strapping, was much improved. A leather belt was procured and worn intermittently for two and one-half years, when it was laid aside and was followed by no recurrence of disturbance in joints.

CASE II.—Mrs. H. Aged thirty-two, native of Porto Rico, para-iii, pregnant six months. Former pregnancies and labors normal. Had always had a free outdoor existence. While in Philippines had an attack of what she was told was pernicious anemia. During present pregnancy two of children had scarlet fever, one measles, one chicken-pox. She, with the aid of a nurse, took care of them at home. While out walking felt something give way and was unable even to attempt to stand. She was found two hours later sitting on the curb unable to rise but in no pain at that time. She had had only vague pains heretofore which had been called rheumatic and so treated. The following day adhesive strapping was applied with such relief that a belt was ordered and worn by her throughout balance of pregnancy and is still being worn, through a period in all of three years and four months. She is perfectly comfortable while wearing belt and incapacitated if she leaves it off.

CASE III.—Mrs. C. Aged thirty-four, American, para-iii. After each pregnancy had suffered from backache which she was told was due to a prolapsus and for which a pessary was inserted with a certain amount of relief. This relief became less with each succeeding pregnancy until after the third when she became much worse in spite of pessary. Pessary was removed and adhesive strapping applied followed with leather belt; since which time, ten months ago, as she expresses it, "does not know she has a back."

Case IV.—Mrs. A. Aged twenty-seven, married, one child six years of age. On April 10, 1910, six years after delivery, found her in a much upset condition as a result of pains in the back from sacrum to base of skull, severe headaches with nausea, and inability to walk more than one or two squares without sitting down. Her labor had been normal but on getting up afterward she began to complain of the aforesaid symptoms which gradually became more severe. These symptoms were ascribed as only those incident to labor and lactation. She underwent osteopathic treatment for a period of eighteen months from which she derived no permanent benefit. On my first visit a strapping of adhesive plaster was placed with immediate relief of all symptoms. A sole leather belt was secured and worn continuously for a period of two years, when she was able to lay it aside.

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THE MODE OF TERMINATION IN ECTOPIC GESTATION.

With Report of Illustrative Cases.

BY

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(With three illustrations.)

Ectopic gestation is of more frequent occurrence than is generally supposed. In the gynecological service at the Jefferson and St. Joseph's Hospitals there were fifty-seven instances of ectopic gestation during the years 1911 and 1913 inclusive. This number also represents 3.4 per cent. of the 1700 gynecological specimens examined in the gynecological laboratory during this period.

The specimens which I desire to report show the various stages of development from two weeks to full term. They further demonstrate the terminations which result in ectopic pregnancy, namely; tubal abortion, tubal rupture, and at times secondary implantation on or in the pelvic viscera. These terminations are frequently fraught with grave danger to the patient.

The diagnosis of ectopic gestation is infrequently made before rupture because the symptomatology and physical signs widely differ in each case. The usual history of a case is that the patient's attention is first attracted to her condition when rupture is imminent or has taken place and it is during this stage that medical attention is first sought. In most cases the onset of symptoms is marked by sudden acute pain in the lower abdomen, with slight vaginal bleeding; the patient going into a state of collapse due to the internal hemorrhage. At this time the diagnosis is not difficult when one takes into consideration the history of irregular menstruation, discomfort or actual pain in the lower abdomen, with the usual antecedent history of sterility. Bimanual examination usually reveals a mass to one side of the uterus, and a boggy sensation to the palpating finger in the posterior culdesac due to the accumulation of the clotted blood. The important question to be decided when called in to see a case of ectopic pregnancy is whether the patient should be operated upon immediately or whether she should be treated expectantly until she recovers from the state of shock. The present teaching is to operate immediately whether the patient is in a state of collapse or not, providing the patient is in aseptic environments; a hospital being the place of preference. But should the surroundings be such as to incur the danger of infection by hasty operation, then it is best to postpone surgical interference and give the patient sufficient morphine to allay her anxiety and to quiet the circulation until she can be removed to more favorable environments.

Tubal gestation is sometimes diagnosed in the unruptured state as is shown in the following instance:

CASE I.—Laboratory No. 6854. A. B., aged thirty, married, white. Began to menstruate at fourteen, regular, two to three days' duration, painless. Last menstrual flow, January 30, 1913. On March 4, slight amount of vaginal bleeding was noticed. March 15 she felt nauseated and suffered from pain in lower abdomen. The pain continued for three days, and on the fourth day she passed a clot of blood from the vagina. She was admitted to Jefferson Hospital on March 19, and operated upon three days later. The abdomen was opened in midline, and the right tube was found considerably distended at its central portion. No free bleeding or blood clots were found in the abdominal cavity. The tube and ovary were removed. The report from the laboratory is as follows: The tube is 7 cm. long, at its middle third the tube is distended, measuring 4 cm. in diameter. Is of semisolid consistency of dark red to bluish color. The fimbriated end is congested but closed. The ovary is small and firm.

Rupture may take place any time after conception. It may be sudden or gradual. The bleeding may take place into the abdominal cavity, then hemorrhage is very profuse. This is well illustrated in the following case of tubal rupture; the rupture being along the upper margin of the tube near the uterine end. In many such instances the patient succumbs before medical aid is of avail.

CASE II.—Laboratory No. 5640. M. K., aged twenty-four, married, white. Admitted to Jefferson Hospital on September 28, 1911, with diagnosis of ruptured ectopic pregnancy. Family history and past medical history has no bearing on present condition. Last menstruation occurred on September 14, or two weeks prior to admission. On day of admission had sharp attack of pain in right side of pelvis associated with vomiting. The patient rapidly passed into a state of shock with subnormal temperature, rapid pulse, extreme pallor, thirst, tenderness in right lower abdomen. Vaginal examination revealed marked tenderness and bulging of posterior vaginal fornix. The patient was hurried to the hospital and operated upon immediately; but two hours having elapsed between onset of symptoms and time of operation. Incision into posterior vaginal fornix revealed free blood in Douglas' culdesac. A strip of iodoform gauze was introduced in the vaginal wound and the abdomen was then opened. Abundant free blood was found in the abdominal cavity. The right tube was slightly enlarged. A small rupture along upper margin of tube near the uterine end showed the site of hemorrhage. The tube and ovary were removed. The abdomen was cleansed of clots, salt solution was introduced into the abdomen and wound closed. As the patient was extremely shocked, salt solution was instilled intravenously during the operation. Patient made an uneventful recovery and was discharged from the hospital twenty-one days after date of admission. The pathological report is as follows: The tube measures 8 cm. in length. Uterine or inner third is distended to 1.5 cm. in diameter, is of a bluish color and covered by a glistening peritoneal coat. A small roughened

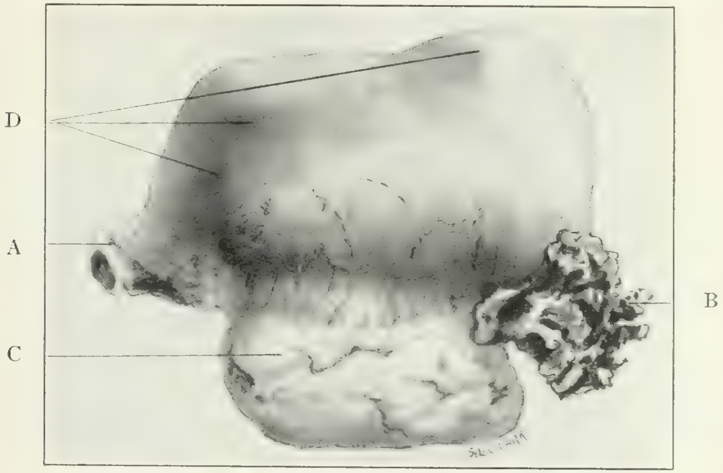

FIG. 1.—Unruptured Ectopic Gestation. A, uterine end of tube; B, fimbriated end; C, ovary; D, thinning of tubal wall due to repeated intratubal hemorrhages.

crater-shaped area 0.5 cm. in diameter is apparent along upper margin at junction of inner and middle thirds, this being undoubtedly the site of rupture. The ovary shows no gross changes and measures 4 × 3 × 3 cm.

The tube usually does not retain the fetus beyond the tenth week: rupture or abortion being the usual termination of the pregnancy.

The following case history is illustrative of rupture of outer end of tube.

Case III.—Laboratory No. 6755. D. B., aged twenty-six, white, married. Admitted to St. Joseph's Hospital on January 28, 1913. The patient married at twenty, had three children, the second was stillborn at eighth month. She began to menstruate at fifteen, flow regular, painless, of three days' duration. Last menstruation November 17, 1912. On arising on morning of January 7, 1913, or seven weeks after last menstrual period, the patient began to pass large quantities of blood clots, this continued for three weeks. With onset of bleeding she also experienced pain in left inguinal region. Pain and bleeding continued irregularly until day of admission to hospital. There was tenderness in lower left quadrant of abdomen. Vaginal examination revealed a uterus slightly enlarged and pushed forward by a mass in Douglas' culdesac. The mass was tender and involved the broad ligament on left side. The abdomen was opened and numerous clots removed. The left tube was found greatly enlarged at its outer third. The tube and ovary were removed, salt solution was placed in the abdominal cavity

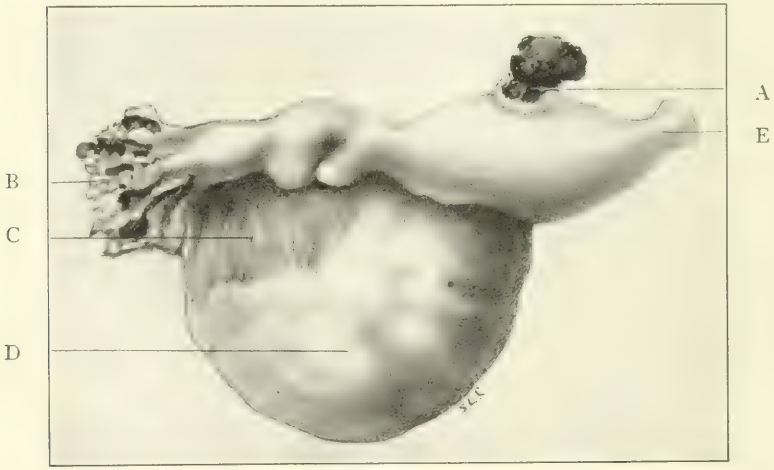

Fig. 2.—Tubal rupture. A, uterine end of tube; B, fimbriated end; C, ovary; D, blood-clot; E, site of rupture, with adherent blood-clot.

and wound closed. Patient made a good recovery and was discharged from the hospital twenty days from date of operation. The tube is pear shaped, the external end is much dilated (7 cm. in diameter). The outer third of tube is enclosed in a mass of clotted blood of dark reddish color and of shaggy appearance and involving the outer margin of broad ligament. The ovary is small and shows no gross changes.

Hemorrhage into the gestation sac causes the ovum to perish, the sac becomes distended with clotted blood due to the eroding action of the blastodermic cells on the blood-vessels causing repeated minute bleeding into the sac thus forming a mole. The pregnancy if situated near the fimbriated end of tube often terminates in tubal abortion. The bleeding in tubal abortion is more gradual and symptoms are less pronounced. The following case is illustrative of tubal abortion.

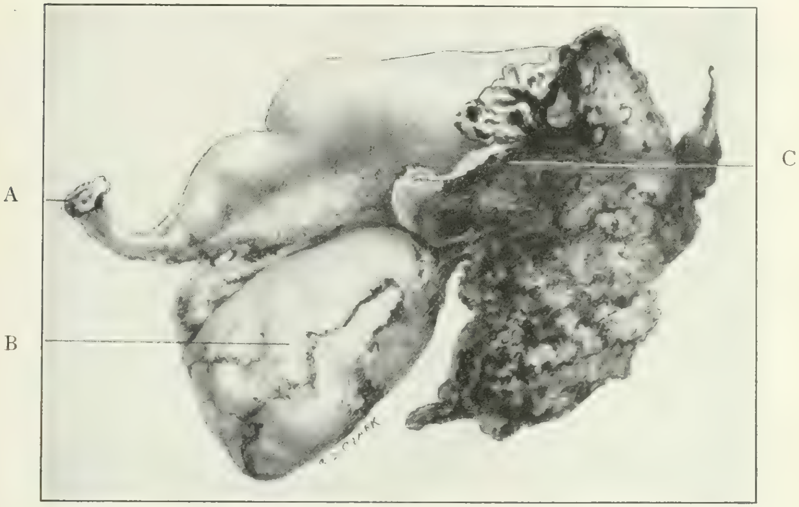

Fig. 3.—Tubal Abortion. A, uterine end of tube; B, ovary; C, distended fimbriated end of tube through which abortion took place.

Case IV.—Laboratory No. 5953. H. K., married, white. Admitted to St. Joseph's Hospital March 15, 1912. Had one normal labor and one abortion prior to onset of present illness. Last menstruation January 14, 1912. Seven weeks after last menstrual flow she began to have slight vaginal bleeding and complained of pain on left side of pelvis. This continued for six days. Vaginal examination revealed a mass to left of uterus. The abdomen was opened. Left tube was found distended at fimbriated end through which extruded the gestation sac in an unruptured condition. No free blood was found in abdominal cavity. The tube and ovary were removed and abdomen closed. The patient left the hospital seventeen days after date of operation. The pathological report describes the tube as being 8 cm. in length, gradually dilating toward the fimbriated end where it attains a diameter of 2 cm. The tubal wall is considerably thinned, the lumen dilated. The dark shaggy mass which was found extruding from the fimbriated end of the tube measures 5 by 4 by 2.5 cm. The ovary shows no gross changes.

Primary rupture between folds of broad ligament is not of infrequent occurrence. The bleeding is limited between the folds. The symptoms in such cases are not marked. The fetus continues to grow until a second and even a third rupture takes place before the patient comes under observation. The fetus in its progressive development becomes too large to be confined to the broad ligament and is finally extruded into the abdominal cavity. The placenta may become adherent to some of the pelvic or abdominal structures, then development goes on, the fetus obtaining its nourishment through this new attachment. This type is known as a secondary abdominal pregnancy. The following case history is illustrative of such a condition.

CASE V.—Laboratory No. 5982. H. B., aged twenty, married, white. Admitted to St. Joseph's Hospital on April 9, 1912. The patient had the diseases common to childhood. Menstruation occurred at twelve, every twenty-eight days, lasting five days, unassociated with pain. Was married at nineteen years, few months later had abortion. Last menstrual flow November 14, 1911. Two weeks prior to her coming under observation, or four and a half months after last menstrual flow, the patient was attacked with sharp pain in the right side. The pain was continuous for two weeks, later pain was also felt on left side. Vaginal examination revealed a large boggy mass to side of uterus. The abdomen was opened and clots removed. Attached to omentum and to posterior fold of right broad ligament and knuckle of tube was a fairly well-developed placenta and gestation sac. Lying free in the abdominal cavity was a fetus attached by its umbilical cord to the placenta. A rent in the sac through which the fetus escaped was quite apparent. The tube, ovary and gestation sac were removed and abdomen was closed. The patient made a good recovery and was discharged from the hospital four weeks from date of admission. The pathological report is as follows: the specimen weighs 650 grams. Placenta is 9 cm. in diameter. Attached to it by umbilical cord 10 cm. long is a well-preserved fetus 16 cm. in length. Two pieces of omentum, the larger containing a firm dark-blue area 4 cm. in diameter, accompanies specimen. Microscopic sections from this showed it to be densely infiltrated by mononuclear cells. Attached to and extending into it are masses of fibrin and blood clots, some of the latter containing pigment. Definite placental tissue was not demonstrable in the sections studied.

In not a few instances the fetus goes on to full term in these secondary abdominal pregnancies, providing the placenta finds firm attachment and the gestation sac remains intact. The patient suspects nothing wrong and believes herself to be normally pregnant. Not infrequently the mother prepares herself for labor. As time approaches for her confinement, some of the patients experience labor pains of a transient character usually associated with violent fetal movements of short duration, but as is self-evident there is not any attempt at spontaneous delivery. As weeks and months elapse past the expected period of delivery the diagnosis is changed by both, physician and patient from pregnancy to an abdominal tumor usually an ovarian cyst. The following case history is a report of a full-term fetus which developed in the abdomen outside of the uterus.*

Case VI.—E. K., aged thirty-four years, married. Admitted to Jefferson Hospital, May 6, 1910, with a diagnosis of ovarian cyst.

Personal History.—Began to menstruate at twelve years, was always regular, lasting from five to seven days, the flow is accompanied by pain during the first two days. Was married at twenty-two years, and went through a normal labor two years later. She remained sterile for ten years.

Present Illness.—Onset of a sudden attack of pain in left lower abdomen was noticed in March, 1909. The symptoms subsided in a few days and she remained well until June. During March, April and May menstruation was regular. In June during the menstrual period she had a recurrence of severe abdominal cramps lasting a few days. Following this attack patient was never entirely free from discomfort in the lower abdomen. Her menstrual flow for the next six months appeared as a muddy discharge and lasted for three to four days. During these months the patient noticed the abdomen enlarging. During January and February she felt fetal movements more or less constantly. In March, 1910, the patient had a bloody vaginal discharge accompanied by severe abdominal pains after which fetal movements ceased. Her abdomen was quite large at this time. Physical examination revealed an ovoidal tumor four fingers' breadth above umbilicus, freely movable in abdomen and was not tender on pressure. She was operated upon in Jefferson Hospital on May 19, 1910. Omental and pelvic adhesions were numerous but were easily separated. The pedicle of the mass, occupying the left tuboovarian region, was ligated and the tumor removed. The other pelvic organs were apparently normal. The patient made a good recovery and was discharged from the hospital on June, 1910. Pathological examination showed the mass to weigh 9 pounds, was more or less elastic due to presence of fluid. An incision into sac revealed a full-term fetus in a good state of preservation attached to the placenta by the umbilical

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* Bland. Report read before Jefferson Hospital Clinical Society, December, 1911.

cord. The fetus weighed 4-1/2 pounds, measured 18 inches in length, the biparietal measurements was 3-1/2 inches. The sac was 21 inches in circumference.

The fetus in secondary abdominal pregnancies if it remains encapsulated and is not removed by surgical means is converted in time either into a lithopedion or it may undergo suppuration, necrosis or may become mummified.

Case VII.—The following is an interesting record of a fetus which had undergone mummification.* The woman carried the mass for thirteen years in the abdominal cavity, having given birth to two healthy children prior to its removal. Until a short time before it was removed she experienced no discomfort in her abdomen as result of its presence. The specimen weighed 3 pounds, and measured 7 inches in its longest diameter, and 4-1/2 inches in its shortest diameter. Separation and dissection of specimen showed it to be composed of the remains of an ectopic pregnancy, and from the fact that the bones and various organs were so far developed it would indicate that the fetus was about seven months old before death took place. The dissected skeleton measured 16 inches in length.

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THE SIGNIFICANCE OF THE NONCOAGULABLE NITROGEN COEFFICIENT OF THE BLOOD SERUM IN PREGNANCY AND THE TOXEMIAS OF PREGNANCY.†

BY

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The term noncoagulable nitrogen coefficient is employed to designate the percentage of total nitrogen which is present in the form of noncoagulable nitrogen. The division of the nitrogenous content of the blood serum into two portions is affected by precipitation of the protein materials with various reagents. The coagulum consists of serum albumin and globulin and the filtrate contains the noncoagulable or nonprotein substances. The former term is preferable because of the question which still exists as to whether the usual methods of precipitation throw down the proteins completely. The noncoagulable portion contains urea, creatine, lecithin, the ammonium salts and various other nitrogen-containing substances. The urea is the most important constituent and accounts for 40 to 60 per

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* Surgery, Gynecology and Obstetrics, November, 1906, p. 67.

† From the Pathological Laboratory of the Sloane Hospital for Women, New York City.

cent. of the whole. The technic for the estimation of the noncoagulable nitrogen has been developed recently and is quite generally used as an aid in the estimation of renal function.

Rowntree and Fitz rank it with the phenolsulphonephthalein test as giving the most definite and reliable prognostic information. Farr and Williams reviewed the rather scanty literature upon the significance of noncoagulable nitrogen in pregnancy and eclampsia and presented twenty-four determinations made upon the whole blood in twenty normal and toxic pregnant women. They concluded that when "there was definite renal insufficiency or eclampsia, there was always, with one exception, a slight, and in most cases, a considerable increase in the total noncoagulable nitrogen," but that "the presence of a rising blood pressure, the condition of the urine as regards albumin and casts, and the clinical picture are severally more important." In a subsequent report, they added the results of twenty additional determinations and drew the same conclusions. Zangemeister also determined the total nitrogen and the noncoagulable nitrogen in eclamptic patients and found that the former was normal, while the latter was slightly increased. Landsberg made similar determinations upon the oxalated plasma of normal pregnant and parturient women, but did not mention any observations in eclampsia.

In all the work thus far reported in the literature only the absolute value of the noncoagulable nitrogen is considered, but not its relative amount. In the cases under consideration, the total noncoagulable nitrogen content seemed to be so variable that I determined to ascertain its ratio to the total nitrogen and express the results in percentages. The determination of the total nitrogen is so simple that it can readily be combined with the noncoagulable nitrogen determination. By the use of this method, it was found that the normal values became somewhat more restricted, while the pathological variations became more marked and thus more readily comparable.

The technic which I employed was a slight modification of that recommended by Widal. Seventy-five to one hundred cubic centimeters of blood were drawn from a suitable vein into a sterile flask, by means of the apparatus described below. The serum was allowed to separate after the clot had been loosened by a sterile platinum needle and then centrifugalized so as to free it from any formed elements. Two portions of 5 c.c. each were placed in 800-c.c. Kjeldahl flasks and a double Kjeldahl determination made. Two other portions of 10 c.c. each were placed in 300-c.c. Erlenmeyer flasks, to each of which 115 c.c. of 95 per cent. alcohol were added. The flasks were corked, gently shaken to insure thorough mixture, and then allowed to stand over night at room temperature. After sixteen to twenty-four hours the mixture was filtered through filter paper and the filtrate collected in 800-c.c. Kjeldahl flasks. The Erlenmeyer flasks and the precipitate were then washed twice with 95 per cent. alcohol and the washings added to the contents of the Kjeldahl flasks; copper sulphate, potassium sulphate and sulphuric acid were added and the mixture thoroughly shaken. Under a hood, the Kjeldahl flasks were heated gently over a small free flame until the alcohol had been completely driven off and then a regular Kjeldahl nitrogen determination was made. Decinormal sulphuric acid was used throughout for the collection of the ammonia in the distillation, and was titrated against N/10 sodium hydroxide, using Congo red as an indicator. Throughout the work all determinations were made in duplicate, and if any serious discrepancy between the two readings was noted the results were discarded. This method was employed because it seemed that the limit of error was smaller when larger quantities of serum were employed, and because in toxic and eclamptic patients the withdrawal of a moderate amount of blood is an advantage therapeutically rather than otherwise. A disadvantage is that in the majority of patients a second bleeding even for 75 c.c. does not seem justifiable merely for experimental purposes.

Apparatus for collecting blood: A heavy glass 2 liter bottle was exhausted as completely as possible by means of a water-suction pump. A 300-c.c. Erlenmeyer flask was then tightly fitted with a two-hole rubber cork which was pierced by two short pieces of glass tubing, one of which projected somewhat below the other and was attached by a short piece of rubber tubing to a small caliber blood culture needle, while the other was attached to the tubing which led to the exhausted bottle. The Erlenmeyer flask was sterilized by dry heat, the rubber cork and attached needle by boiling, while the skin was cleaned with alcohol. After sterilization, the short glass tube of the flask was connected by the rubber tubing to the exhausted bottle. The needle was inserted in a vein and the flow of blood regulated by controlling the suction by means of a pinch cock. By this method practically any quantity of blood can be obtained through a small needle with much less exertion than when mouth suction is employed. One should be careful to use a rather heavy Erlenmeyer flask, as otherwise, the outside air pressure may crush it if too great suction is employed.

In my observations the sera from twenty-seven women were examined for the noncoagulable nitrogen coefficient. These included seven normal women in the last month of pregnancy; three normal women in the first ten days of the puerperium; seven patients suffering with toxemia of pregnancy, and eight patients who were having convulsions. The remaining two determinations were made upon convalescing toxic and eclamptic patients, whose blood had previously been examined.

Chart I shows the results of the determinations on the normal pregnant and puerperal patients.

In the seven normal antepartum patients represented in Group A the total nitrogen varied from 9.394 to 12.33 grams per liter, the average being 10.671 grams; while the noncoagulable nitrogen varied from 0.280 to 0.413 grams per liter, the average being 0.347 grams; and the noncoagulable nitrogen coefficient varied from 2.72 per cent. to 3.72 per cent., the average being 3.26 per cent. The patient in Case 5 was toxic during a previous admission, and when re-admitted this time showed traces of albumin in the urine, but presented no signs or symptoms of renal insufficiency when the blood was drawn for study.

In the normal puerperal patients in Group B the total nitrogen varied from 10.37 to 11. grams per liter, an average of 10.61 grams; the noncoagulable nitrogen varied from 0.350 to 0.406 grams per liter, an average of 0.371 grams, while the noncoagulable nitrogen coefficient varied from 3.18 per cent. to 3.87 per cent. and averaged 3.49 per cent. The patient in Case 22 was considered toxic on admission, presenting a blood pressure of 150 mm. and a trace of albumin in the urine, but no casts. While she was apparently normal when the blood was taken, it is highly probable that a slight nephritis may account for the rather high coefficient.

From the consideration of these findings it seems that the following standards may be adopted for normal patients on an unrestricted diet: 9.30 grams per liter for the low limit of total nitrogen; 420 grams per liter as the upper limit for the noncoagulable nitrogen, and 3.90 per cent. as the upper limit for the noncoagulable nitrogen coefficient. While it is realized that a larger series of observations are necessary before definite normals can be satisfactorily established, yet in all probability no marked change from these figures would result.

I shall now compare with these standards the findings in patients suffering from toxemia and eclampsia. Chart II shows our findings in this class of cases. Group C consists of patients suffering from toxemias of pregnancy but without convulsions; Group D those who apparently had true hepatic eclampsia; and group E a single patient presenting uremic convulsions resulting from chronic nephritis.

In Group C the total nitrogen varied from 7.67 to 9.77 grams per liter, the average being 8.69 grams; the noncoagulable nitrogen varied from 0.364 to 0.484 grams per liter, the average being 0.425 grams; and the noncoagulable nitrogen coefficient varied from 3.97 per cent. to 5.84 per cent., the average being 4.93 per cent. It is to be noted that these averages are all above the normal limits which have been arbitrarily set. In all but one case the total nitrogen was below the normal standard, while four out of seven showed a noncoagulable nitrogen above normal, and the entire number showed an abnormally high noncoagulable nitrogen coefficient. With one exception (Case 8) the coefficient was considerably above normal, and this patient alone was discharged without both albumin and casts in the urine.

It would therefore seem that clinically all the patients, except in Case 8, had sustained considerable damage to the kidneys, as was evidenced by the persistence of albumin and casts in the urine for two weeks after delivery. While, on the other hand, the low noncoagulable nitrogen coefficient in Case 8 would seem to indicate that there had been very little renal disturbance in this patient. In Case 14 a second determination eighteen days after the first showed that all of the readings had returned to normal limits notwithstanding the fact that the urine still contained albumin and casts. Accordingly from the clinical side, it seems that the convalescence of the patient varies with the degree of retention of the noncoagulable nitrogen, as shown by its relation to the total nitrogen.

In Group D, eclampsia, the total nitrogen varied from 8.45 to 11.13 grams per liter, the average being 9.81 grams; the noncoagulable nitrogen varied from 0.280 to 0.455 grams per liter, the average being 0.366 grams; and the noncoagulable nitrogen coefficient varied from 3.02 per cent. to 4.71 per cent., averaging 3.74 per cent. Thus, it is seen that in true eclampsia the averages are all within normal limits, as the total nitrogen and the noncoagulable nitrogen coefficient were normal in five out of seven cases, while the noncoagulable nitrogen was normal in all but one case. In Case 20 a second determination showed a slight change after fourteen days, the significance of which is not evident.

Group E contains only one case. In this instance a diagnosis of chronic nephritis had been made upon admission a year previously, and even though convulsions had occurred during the present pregnancy, it is reasonable to assume that they were a manifestation of uremia. The findings in this case, it will be noticed, were the most abnormal in the entire series. The patient died on the day of delivery, after a profuse hemorrhage due to premature separation of the placenta and this seemed to be the actual cause of death with the renal insufficiency playing a secondary rôle, although unfortunately an autopsy was not permitted.

There is a striking difference between the findings in the patients with toxemia and those with eclampsia, both in respect to the partition of the serum nitrogen and to the clinical course as shown by the urinary findings. While the toxemic patients must have represented a form of preeclamptic toxemia, there evidently was considerable damage to the kidneys, as was indicated by the high noncoagulable nitrogen coefficient, and confirmed by the persistence of albumin and casts after delivery. The eclamptic patients, on the other hand, seemed to suffer from a true hepatic toxemia with very little if any damage to the kidneys. In these the albumin disappeared promptly from the urine, except for the trace which is usually present in the voided specimens of puerperal women, and casts could not be found at the time the patients were discharged from the hospital. This is directly in line with the pathological conception of eclampsia as a disease of the liver, with a cloudy swelling of the kidney cells, resulting from a general intoxication, but with no permanent injury to the excretory cells. The fact that even during the eclamptic attacks the noncoagulable nitrogen coefficient may be normal is in accord with current pathological views, while the clinical course certainly bears out the same point.

Conclusions: The noncoagulable nitrogen coefficient is a better index of kidney function than the total noncoagulable nitrogen alone.

In the toxemias of pregnancy and in eclampsia the noncoagulable nitrogen coefficient seems to be of some value in prognosticating the degree of permanent kidney change and in differentiating renal from hepatic toxemias.

Possibly, if the noncoagulable nitrogen coefficient were determined in other renal disorders, not especially connected with pregnancy, additional information might be obtained which would increase the clinical and prognostic value of the test.

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TABLE I.

GROUP A.—Normal Women in Last Month of Pregnancy.

Number	Para	Total nitrogen, grams per liter	Noncoagulable nitrogen, grams per liter	Noncoagulable nitrogen coefficient	Urine on admission		Blood pressure	Urine on discharge		Remarks
					Albumin	Casts		Albumin	Casts	
4	I	10.416	0.350	3.36	Faint trace	0	?	0	0	
5	II	11.172	0.371	3.32	Trace	0	120	Faint trace	0	Albumin once 5 per cent. (vol.). Had toxic (?) rash.
6	I	9.394	0.350	3.72	0	0	130	0	0	
7	III	11.200	0.413	3.68	0	0	?	0	0	
9	IV	12.330	0.336	2.72	0	0	125	0	0	
10	I	9.759	0.280	2.87	Very faint trace	0	?	Trace	Occas. hyal.	
11	II	10.430	0.329	3.15	Trace	0	?	0	0	
Group B.—Normal Postpartum Women.										
22	VIII	10.470	0.406	3.87	Trace	0	150	Trace	0	Considered toxic on adm., no symptoms later 9 days postpartum.
23	I	10.370	0.357	3.44	0	0	?	0	0	6 days postpartum
24	III	11.000	0.350	3.18	0	0	?	0	0	7 days postpartum.

TABLE II.

Group C.—Toxemia without Convulsions.

Number	Para	Total nitrogen, grams per liter	Noncoagulable nitrogen grams per liter	Noncoagulable nitrogen, coefficient	Urine on admission		Blood pressure	Urine on discharge		Number of convulsions	Remarks
					Albumin	Casts		Albumin	Casts		
8	I	9.156	0.364	3.97	20% (vol.)	0	160	Trace	0	0	Spont. labor.
12	I	9.110	0.420	4.60	95% (vol.)	+	150	Trace	+	0	Twin pregnancy, breech and version.
13	I	9.180	0.385	4.19	30% (vol.)	+	150	Trace	+	0	Low forceps.
14A	I	9.770	0.484	4.96	Solid	+	146	Trace	+	0	Induced, spont.
B	.....	10.820	0.371	3.42	....	.....	...	....	......	...	18 days later.
16	I	7.670	0.448	5.84	Heavy trace	+	130	Trace	+	0	Spontaneous.
19	XI	7.868	0.434	5.51	Solid	+	185	10% (vol.)	+	0	Spontaneous.
27	I	8.060	0.441	5.47	Solid	+	160	11½% Esbach	+	0	Accouchement Forcè,

GROUP D.—Eclampsia.

Number	Para	Total nitrogen, grams per liter	Noncoagulable nitrogen grams per liter	Noncoagulable nitrogen, coefficient	Urine on admission Albumin	Casts	Blood pressure	Urine on discharge Albumin	Casts	Number of convulsions	Remarks
15	I	8.450	0.399	4.71	10% (vol.)	0	?	0	0	12	Postpartum.
10A	I	10.020	0.336	3.35	95% (vol.)	0	150	Faint trace	0	11	Induced, version.
B	.....	11.600	0.308	2.65	....	.....	...	....	......	...	14 days later.
21	I	9.850	0.455	4.61	80% (vol.)	++	200	Trace	0	7	Vaginal hysterotomy.
28	I	9.268	0.280	3.02	Solid	+	?	0	0	2	Induced, spont.
29	I	10.584	0.413	3.90	90% (vol.)	+	125	Trace	0	19	Induced, forceps.
30	I	9.380	0.308	3.28	Trace	0	?	Trace	0	4	Spontaneous.
31	II	11.130	0.371	3.33	1/2% Esbach	+	138	0	0	7	Postpartum.

Group E.—Chronic Nephritis with Uremic Convulsions.

Number	Para	Total nitrogen, grams per liter	Noncoagulable nitrogen grams per liter	Noncoagulable nitrogen, coefficient	Urine on admission Albumin	Casts	Blood pressure	Urine on discharge Albumin	Casts	Number of convulsions	Remarks
26	V	7.938	0.476	5.99	80% (vol.)	++	238	....	.....	2	Died, no autopsy.

OCCIPUT POSTERIOR POSITIONS.

BY

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Minneapolis, Minn.

All presentations of the occiput are commonly regarded as normal. If normal they are far from being uneventful, for owing to the relative frequency of occiput posterior positions many prolonged and complicated labors result. Figures vary considerably, but Rice has quoted percentages which are probably as accurate as any. Approximately 95 per cent. of all cases at term have a vertex presentation. In about 85 to 90 per cent. the sagittal suture lies in the right oblique diameter of the pelvis. This means that 85 to 90 per cent. are either O. L. A. or O. D. P. As you all know this diameter is somewhat longer than the left oblique in the living subject because of the presence of the large bowel on that side of the pelvis. Fortunately the anterior positions are much more frequent. They occur in 60 to 65 per cent. of the cases while the posterior make up a total of 30 to 35 per cent. In this connection it is interesting to note an analysis of 300 cases by Geddes, who found posterior positions in 10.5 per cent. of all vertex cases in multiparæ and 20.8 per cent. in primiparæ. Whether or not the firmer abdominal walls of the primipara favor an occiput posterior position is worthy of thought. The number of his cases is too small to make his percentages free from probable error. Other observers state that the posterior positions occur in from 30 to 40 per cent. of all cases. It would seem fair to assume that this group would represent about one-third of all cases.

The seriousness of the condition may be emphasized by the experience of one observer (Rice), who states that the use of instruments is increased tenfold, that the mortality of the fetus rises from 4 to 10 per cent. and that interference is called for in from 4 to 8 per cent. of the cases. He neglects to state the percentage of increase of complications to the mother.

Sawyer in a report of thirty-eight cases states that six children were born dead and that four others died within thirty-six hours—a fetal mortality of over 26 per cent.

My own experience in these cases has been such as to make me hesitate every time it seems necessary to interfere in an occiput posterior position. I no longer interfere until a continuation of the labor is a distinct menace to either the mother or the child.

The course of labor is lengthened considerably in occiput posterior positions. Varnier in comparing 400 cases of occiput posterior with 660 of occiput anterior found that labor was three hours and sixteen minutes longer in primiparæ and one hour and fifty minutes longer in multiparæ with the small fontanelle posterior.

Rice in a study of 1000 cases found that in primiparæ the labors averaged four hours longer in posterior positions and were three hours and thirty-nine minutes longer in multiparæ.

In order to understand the causes of this lengthened labor it is necessary to understand the mechanism of delivery in this position. It is a familiar fact that rotation has to take place through 135° instead of 45° as in the occiput anterior positions. This is, however, only a partial explanation. There is a tendency to early rupture of the membranes. In 1000 cases of anterior vertex presentations at the Manhattan Maternity Hospital the membranes were intact in 60 per cent. at the beginning of the second stage of labor. In 400 occiput posterior positions the membranes were unruptured in 43 per cent. at this stage.

Rupture occurs at the onset of labor in about one-fifth of the occiput posterior positions. This is probably due to the fact that the head does not fit into the inlet as accurately in posterior as in anterior positions and consequently greater direct pressure is brought to bear on the membranes over the uterine os.

The force is not as well applied because the apex of the wedge does not coincide as well with the pelvic axis as in the anterior positions. These factors lengthen the labor by retarding descent and hindering rotation of the head.

The time of rotation and its mechanism has been explained in two ways:

First: The same process as that described for anterior vertex presentations occurs, except that as a greater degree of rotation is necessary the head engages in the right oblique diameter with the small fontanelle posterior, it remains flexed, descends, rotates to the transverse diameter, then into the left oblique and is delivered under the pubic arch as an occiput anterior. In this mechanism the head adjusts itself to the pelvic diameters as it is forced downward.

Second: The head does not follow the different pelvic diameters but is driven downward until the occiput reaches the pelvic floor and then rotates near the pelvic outlet.

It seems very likely that both of these occur. In some cases rotation occurs early in labor and unless seen before or soon after the onset they present all the signs of an anterior position though primarily transverse or posterior. In other cases rotation is delayed and may be watched as the head gradually appears at the introitus.

Leaving out of consideration cases with abnormalities in the mother or child, which it is not my intention to consider at this time, there are variations in this mechanism which are of the greatest importance. The engagement of the head may be greatly delayed or prevented in these posterior positions by incomplete flexion or by asynclitism either anterior or posterior. Descent may be slow and checked in the pelvic canal by poor flexion and poor rotation. There may occur the so-called deep transverse arrest of the head—the head remains stationary and will rotate neither anteriorly nor posteriorly. In a small percentage of cases, probably from one to two, the occiput rotates to the rear. By some this is regarded as a very serious complication and spontaneous delivery is regarded as impossible. Other observers state that most of these cases may be delivered spontaneously. I have seen a considerable number of these persistent occiput posterior cases delivered without aid or especial difficulty. On the other hand, I have had the utmost difficulty in terminating the labor by artificial means. It is a condition which may be, but is not necessarily, a serious complication. A weak pelvic floor favors extension of the head and hinders rotation. The possible conversion of an incompletely flexed head into a brow or face presentation is to be considered.

In order to deal with these cases where the occiput is posterior it is, of course, necessary to recognize the condition. This may be easy or extremely difficult. It is almost always easy to decide whether or not there is a vertex presentation, but to determine the position certainly and accurately will many times tax the diagnostic ability of the most careful observer. There are certain things which occur in the progress of a case which should suggest to the attendant the possibility of this condition being present.

The rupture of the membranes before or at the onset of labor is suggestive; a labor which progresses slowly also is significant, the occurrence of actual false pains with some dilation of the cervix, severe pain often referred to the back due possibly to the unfavorable position of the head and the posterior pressure are all readily observed and should at least suggest the presence of a posterior position. It is possible to make a diagnosis by the use of three methods of examination enumerated in the reverse order of their importance as means of diagnosing fetal position, (1) rectal, (2) vaginal, and (3) abdominal.

The findings in the first two are so similar as to need no repetition and will be considered together. The cervix often has a peculiar feeling and has been called the parchment os, it lies rather free in the vagina due to the fact that the presenting part is not crowding firmly against the lower segment.

There is a feeling of emptiness in the hollow of the sacrum. Often the large anterior fontanelle is met by the examining finger and is a sign of incomplete flexion. It must not be confused with the sagittal fontanelle which occurs in some places.

The small fontanelle is often very difficult to reach but is located posteriorly, sometimes this can be reached more easily by rectal than by vaginal examination. The sagittal structure lies in one or the other oblique diameter. In cases where it is difficult or impossible to make out the sutures and fontanelles because of a caput succedaneum the maneuver of Scanzoni is of great value. The ear can be located and the direction of the rima will give a clue to the position.

The most important means of diagnosis is by abdominal examination and here palpation is the one method to be chiefly relied upon.

To make a proper abdominal examination, the patient should have both the bladder and rectum empty in order to give as favorable an opportunity as possible for making a proper obstetrical examination. The patient should lie near the edge of the bed or table that she may be easily accessible to the examiner. The most favorable position for abdominal examination is that in which she is lying evenly on her back with her legs fully extended the arms alongside of the trunk and with the head slightly elevated. It is, of course, much better to examine the abdomen bare and I rarely ever meet with a patient who seriously objects to being uncovered.

The examination may be made during pregnancy or while the woman is in labor. If made during gestation the diagnosis of the child's position has little value unless made during the last month. After this time the presenting part is not apt to change a great deal though one position may be converted into another.

When the abdomen is examined with the woman in labor it is, of course, essential that it be conducted when the uterus is relaxed between the pains.

There are some variations in the method of making the abdominal examination and it does not seem essential to follow any particular method. The important thing is to have a routine and then follow it out.

It is essential in any examination to locate the different parts of the fetus. In order to do this try to determine what part lies in the fundus, then endeavor to locate those lying in the corpus, and determine which parts lie to the right or left and whether they are directed more anteriorly or posteriorly and then to find the presenting part.

In order to give this to you systematically the subject will be considered in the same way as usually presented in physical diagnosis.

Inspection often gives one a fairly good idea of the position of the fetus. The points to be noted in this connection are the direction of the fetal ovoid, whether inclined to the right or left of the median line, then to note the outlines of the fetus.

The active movements can often be seen and give one a very definite idea of the location of the small parts.

Palpation is the most important means of diagnosing the position of the fetus. It is often possible to intensify the findings by pressing the top of the fetal ovoid downward toward the pelvis with the flat of one hand, thus increasing the convexity of the fetus and bringing it in closer apposition with the abdominal wall. Another way is to press the ulnar edge of one hand deeply backward in the midline of the abdomen thus displacing the fetus to one side and the liquor amnii to the other.

The routine suggested for making this kind of an abdominal palpation is to stand or sit at one side, facing the head of the patient who is lying in the position previously described. The distance of the fundus from the xyphoid is noted, then the fetal ovoid is outlined with both hands to determine its general direction as already shown by inspection. The fundus is now carefully palpated to feel what parts are there and what relative position they occupy. The corpus is then carefully palpated and the back and small parts accurately located. The former is recognized by the smooth, flat and hard feeling while the opposite side presents the irregular hard nodular feeling of the small parts and the soft fluctuating areas that lie between. Often one can move the small parts or feel them move spontaneously.

The examiner now faces about and places both hands flat on the abdomen with the fingers well down toward the pubes and the knuckles opposite the superior iliac spines. By pressing inward and backward carefully with the hands flat it is possible to feel the part which is present in the pelvic inlet. It is important to note its consistency configuration and the comparative height and prominence of the sides. One should also note the mobility and the relations to the maternal pelvis.

Another maneuver for feeling the presenting part is to place one hand transversely just above the pubes and grasp the fetal part with the fingers on one side and the thumb on the other.

Percussion has no value in the diagnosis of the position of the child.

Auscultation has no more than confirmatory value and very little reliance should be placed on the location of the fetal heart in making a diagnosis of the position.

I shall now call attention to a few points that may prove of value in differentiating cephalic, breech and transverse presentations.

The essential fact in making a diagnosis of a cephalic presentation is the location of the head at the pelvic inlet. In this connection it is important to remember that the vertex is the only part that engages in the inlet prior to the onset of labor pains. It is, of course, impossible to say just what part of the head will present until it has engaged in the inlet.

Palpation shows the breech lying in the fundus, the back turned toward the right or left either more anteriorly or posteriorly. If the fetal back is anterior, one feels a much broader surface, and the anterior shoulder is located only a short distance from the midline. The small parts are much less accessible if the back is directed anteriorly.

In posterior positions the small parts are very distinctly palpable and may be almost in the median line.

The next important step is to palpate the head carefully to determine whether or not flexion or extension is present.

If it is flexed, in other words if the vertex presents, the more prominent and higher part of the head is located on the side opposite to the back.

If the head is extended, one follows the back downward and finds a round hard mass that makes a very decided angle with it and on the opposite side the chin often presents a characteristic sharp sensation and sometimes feels almost horseshoe shaped through the abdominal wall. These things indicate a face presentation. The position of the upper fetal pole varies with flexion or extension of the head. In the former it usually lies on the side corresponding to the occiput; in the latter it usually occupies the side opposite. In face presentations one should always consider the possibility of an anencephalic monster.

The fetal heart is usually heard to best advantage through the back of the child if the head is flexed, but in extension the chest is thrown out toward the abdominal wall and gives chance for better transmission through the front of the fetal chest.

In most cephalic presentations the heart tones are heard better below the level of the navel.

In abdominal examinations we have certain findings which are common to all vertex presentations, viz., the breech is located in the fundus; the head is over the brim; the back is located on one side of the corpus with the small parts on the opposite side; the very important fact to bring out is that the higher prominence of the flexed head is on the side opposite to the fetal back. The fetal heart is usually heard most distinctly in one of the lower quadrants of the abdomen. The sound is commonly transmitted through the back or side of the thorax in vertex presentations.

It is more difficult to diagnose the kind of vertex presentation or the position than to decide upon an occiput as the presenting part. Usually there is no trouble in deciding between a right and left position but oftentimes there is great difficulty in distinguishing an anterior from a posterior position by abdominal examination. There are some points which are of great value and usually enable one to make an accurate diagnosis.

In anterior positions the upper pole or the breech usually lies near the midline or slightly toward the side occupied by the vertex. In posterior positions this pole lies more lateral and nearer the uterine cornu of the side where the fetal back is. In anterior positions the small parts may be located with considerable difficulty usually lying well to one side and behind the trunk of the child.

Where the vertex is posterior the small parts are near the midline; are directed anteriorly and consequently are much more easily felt.

The trunk lies near the midline and usually the anterior shoulder can be felt in this vicinity in the anterior presentations while in posterior positions the trunk lies more toward the mother's back, the anterior margin is some distance from the midline on the side where the vertex lies. This finding applies also to the anterior shoulder.

The prominence of the head on the side opposite to the fetal back is usually more marked in the occiput posterior than in the anterior positions.

The point of maximum intensity of the fetal heart tones is generally nearer to the midline in the anterior positions.

The treatment or rather the management of these cases is at times one of the most trying and difficult procedures in obstetric practice. I wish to enumerate five possible methods of handling these cases: (1) Waiting for spontaneous delivery, (2) assisting in maintaining flexion and furthering rotation of the head by manual methods, (3) using the vectis or forceps to bring about rotation and descent of the head, (4) podalic version, (5) possibly Cesarean section. In order to get this matter before us clearly these cases may be divided into three main groups:

I. The large diameter of the head above the brim, head not engaged.
II. Head in the parturient canal but above the ischial spines.
III. Head below these bony spines.

We shall consider group I first. Attempts to rectify the posterior positions by postural treatment have been of little avail. I refer especially to the use of the lateral and knee-chest positions. This group may be subdivided into cases (*a*) without and (*b*) with the membranes ruptured.

In those cases with the membranes intact nothing should be done to favor their rupture. The preservation of the membranes is important for the following reasons. Probably nothing is more favorable for a proper termination of these cases than late rupture of the membranes. A good bag of waters ensures dilatation of the cervix and favors rotation of the head. Lastly if interference is necessary it is possible to perform the operation of election rather than that of necessity.

Everything possible should be done to favor strong pains such as keeping the patient sitting or standing. Voluntary efforts should not be encouraged at this stage.

Where labor has continued for a long time with little if any progress and signs of maternal exhaustion appear, the patient should be given a rest by the use of morphine and atropine.

After recuperation, if flexion of the head is incomplete or asynclitism is present and there is much at stake, Cesarean section should be considered, especially in multiparæ giving a history of difficult labors possibly with stillbirths and in primiparæ. This would be true especially in cases with incomplete effacement and dilation of the cervix.

In cases with a dilated or dilatable cervix, podalic version should be the operation of choice.

In those cases with good flexion and no asynclitism the labor may be allowed to continue, with the idea of securing better cervical dilatation, cephalic rotation and descent. If such a case fails to progress satisfactorily the choice would lie between manual rotation, forceps and podalic version. If manual rotation is successful the case may go on to spontaneous delivery. If after manual rotation the head does not remain in its new position forceps may be applied to hold it and delivery completed with the occiput anterior. If manual rotation cannot be accomplished with the head well flexed podalic version is the operation of choice.

In the second subdivision with the membranes ruptured we have a different problem with which to deal. The escape of fluid should be prevented as much as possible by having the patient in a horizontal position. This may save the child.

The cases where rupture has taken place just before interference is undertaken may be regarded as belonging to the preceding subdivision.

In those cases where the amniotic fluid has drained away we have practically only three courses to pursue, waiting, artificial dilatation of cervix, maintaining flexion and securing rotation of the head, and lastly the use of forceps. We always have another procedure to fall back upon which I have not as yet mentioned; that of a mutilating operation on the child.

Podalic version and Cesarean section are both excluded, the one on account of the danger of uterine rupture and the other because of technical difficulties and the risk of infection.

In group II the same subdivisions may be recognized. In these cases the cervix is either fairly well dilated or dilatable.

In cases where the termination of labor is necessary from exhaustion of the mother, threatened danger to the child or a stationary head, the procedure to be followed should depend upon the amount of amniotic fluid in the uterine cavity and the position of the head.

In the first subdivision where there is plenty of amniotic fluid, three methods of delivery should be considered as proper. First, flexion and rotation of the head by manual methods; second, delivery by forceps; third, podalic version. Which of these methods is to be selected depends largely on the position of the occiput. If it lies posterior or in the transverse diameter manual rotation and flexion of the head should be tried and if successfully accomplished forceps should be applied. If the attempts at rotation are unsuccessful, podalic version should be done.

If the occiput is anterior, the forceps operation should be done. Where the amniotic fluid has been lost manual rotation should be tried; if successful, the instruments may be applied with the occiput anterior. If unable to rotate the head manually, one is confronted with one of the most difficult of forceps deliveries. We should strive in every possible way to avoid delivery with the occiput to the rear. Traction on forceps with the head in this position tends to extend rather than flex the head and makes a difficult situation still more difficult.

The proper procedure would be to make a pelvic application of the forceps and by proper traction away from the occiput, seek to rotate the occiput anteriorly. If this is successful the forceps are removed and a cephalic application made and the child delivered.

In group three, there is usually complete dilatation. There are practically only two methods which can be used, (1) manual rotation, (2) forceps. If the occiput is anterior and indications are present for completing the delivery, a simple low forceps is all the procedure necessary. If the occiput is posterior, manual rotation may be tried but is very difficult, if successful, it is easy to complete the delivery with forceps. If manual rotation fails the forceps may be used as described above to effect the delivery or if this is not easily accomplished the head may be carefully delivered with the occiput to the rear.

In conclusion I should like to emphasize the importance and difficulties of these occiput posterior positions. It seems to be a phase of obstetrics which is in need of more careful study that proper indications and modes of procedure may be more fully and firmly established.

TRANSACTIONS OF THE AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS.

Proceedings of the Twenty-seventh Annual Meeting held at Buffalo, N. Y., September 15, 16 *and* 17, 1914.

The President, CHARLES NORTON SMITH, M. D., *in the Chair.*
(Continued.)

THE SIGNIFICANCE OF UTERINE HEMORRHAGE.*

BY
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THIS brief paper and appended case reports are submitted to this Association to emphasize the necessity of a more critical and painstaking diagnosis. Dr. Mix of Chicago, says that 60 per cent. of all

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the time given in making a diagnosis should go to a careful history-taking. So true is this in the study of the subject that, should all the other means be taken from us, careful, thoughtful and analytical history-taking would furnish more correct diagnoses than are now made with all the other diagnostic methods and the history carelessly passed over.

The study of pathology depends upon our knowledge of anatomy and physiology. We cannot expect to detect pathology unless we observe and have at our command the story of the normal physiology of the patient. Each woman has a menstrual history of her own. It is essential to find when that history changes and the bearing this will have on her morbidity.

Normally, and usually, women menstruate at intervals of twenty-eight days, the duration of the flow varying from three to five days. Yet this does not mean that women may not be well and strong in the absence of regularity as to periodicity or duration of menstruation. Some women regularly have an intermenstrual period extending several days beyond four weeks, others menstruate at intervals of two, or five, or more months. Some women menstruate every three weeks or less. The same variation may be noted as to the duration, quantity and quality of the flow. We all know of such instances. Yet in many of these patients these irregularities seemed naught but physiological. We should study then these peculiarities and variations in physiology and when we meet a patient who departs from the normal type of menstruation she should command our fullest attention and consideration. For some time, and especially the last few months, I have been appalled at the ignorance of so large a number of women regarding their generative organs and the extent to which they neglect themselves even when they know they are not well, and what is worse is the carelessness of some physicians who, when consulted by these patients, treat them indifferently, though some of these poor victims may already be lost to the inroads of malignancy.

Let me interject here that notwithstanding what has been done to educate the laity along this line in medical societies by distribution of reprints and by publishing articles on the subject of cancer in the lay press, as well as lectures to mother's clubs, etc., we should have more of it still. It is not too much to say that we should commence this education a little closer at home. There is no curative treatment for advanced cancer. All successful treatment depends upon an early diagnosis when the disease is still localized. Too much has been said about the cancer age. There is no cancer age. Cancer attacks all ages. My small experience teaches me to view with suspicion all women who have abnormal bleedings from the uterus.

Case I.—Miss T. G. Admitted to Providence Hospital April 19, 1913. Aged twenty-three, occupation, journalist. She had been regular in her menses, both as regards duration and quantity until one year ago when she began to have an offensive discharge. This was soon followed by a more profuse menstruation and a little bloody discharge between periods. She never had consulted a physician until the day before her admission to the hospital. Six months before coming to the hospital she began to have indefinite pelvic pains. An examination showed the whole vagina, filled to the vulva, the site of a carcinomatous growth. She was never treated for this. She probably had this tumor for one year. Her history would indicate it. Thus the disease began in her twenty-second year. She died July 21, 1913, three months after admission to the hospital.

Case II.—Dec. 14, 1912, Mrs. A. B., aged twenty-four. German extraction, dressmaker by occupation and always enjoyed good health. Four months ago she married and then she noticed that after each coitus she bled moderately for twenty-four hours. Her menses up to four months before her marriage had been regular; since then the quantity of blood lost remained the same, but the menstrual period was prolonged. She never had been pregnant. She consulted a physician who gave her local treatment for about two months. One of her first questions was: "Is it natural for a woman to have this experience when married?"

Examination revealed a profuse bad-smelling discharge and a crater-shaped cervix with widespread induration extending half way down into the vagina. Pelvic organs fixed. She was inoperable; though the actual cautery was used twice. She lived four months.

Case III.—Mrs. M. F., of Birmingham, housewife, aged twenty-six, married, mother of one child which died at birth. Mother died of cancer of uterus. Father died at age of thirty-five, cause unknown. One brother living and well. Never was ill, except measles during childhood and "inflammation of ovaries" lasting two weeks. Menses regular until seven months ago.

Present illness began six months ago with pain in lower abdomen and menorrhagia. Four months ago patient began to menstruate every two weeks; gradually she lost all knowledge of regularity, flowing a few days, then stopping a day or two. During this time she had pain in her lower abdomen and was losing weight. Five months ago she was curetted by a physician who said a great deal of soft material scraped away. The scrapings were not examined microscopically.

Patient came to St. Mary's Hospital June 15, 1914, with a foul-smelling discharge, which had been constantly present since the curetment. Patient has lost 25 pounds in weight.

Physical Examination.—Heart and lungs normal. Urine shows trace of albumen. Her skin is very pale and muscles are flabby.

Hemoglobin 30 per cent.; leukocytes 10,500; red cell 1,900,000. Abdomen negative. Vaginal examination reveals excessively ulcerated and enlarged cervix. The uterus and upper vagina are fixed and bleed upon touch. What had been the cervix was a mass with crater formation which had invaded the right parametrium. This was an inoperable case save for cauterization.

Case IV.—Miss J. Z., aged thirty, native of Austria. Always well until three years ago. First menstruation at sixteen; regular thereafter until three years ago, when she was troubled considerably with prolonged painful menstruation. Had one ovary and appendix removed at that time. Menstruation again became regular and remained so up to the present complaint. About five months ago she began to have pain and distress in lower abdomen with prolonged painful menstruation. These symptoms gradually increased in severity.

She was admitted to the gynecological service at St. Mary's Hospital May 21, 1914. Examination of respiratory and circulatory systems negative. The cervix uteri was soft and infiltrated. The right parametrium was involved sufficiently to fix the uterus on that side. Curetment, May 23; laboratory reported carcinoma on May 26. A panhysterectomy was performed. She returned this month with recurrence of the growth and metastases.

These four cases offer sufficient illustration to show that age and celibracy offer no immunity to cancer of the uterus. The two cases treated by physicians for two and five months respectively by "local applications" was little short of criminal.

Case V.—Mrs. C. P., aged twenty-six. Housewife, Polish. Was admitted to the gynecological service at St. Mary's Hospital April 21, 1914. For years she had had trouble in the lower abdomen, accompanied by menorrhagia. Her condition became worse of late. Uterus and adnexa were firmly fixed. A double salpingectomy with the removal of left ovary was done. At the same sitting the uterus was curetted and scrapings sent to laboratory. April 24, the pathologist reported carcinoma of fundus uteri. Patient refused hysterectomy and left the hospital on May 6, 1914.

Case VI.—Mrs. C. B. Housewife, Belgian, aged twenty-nine. Healthy and strong. Was admitted to clinic at St. Mary's Hospital in July. We were unable to get a clear history on account of not having an interpreter, but learned that, usually, she was regular in her menstruation, but three or four months ago she had missed her period for about three weeks. She began to flow more or less constantly. Physical examination was negative, except that uterus was soft and somewhat enlarged. She was curetted. The laboratory reported chorioepithelioma. She refused a radical operation.

Case VII.—Mrs. M. V. Housewife, aged thirty-nine. Admitted to St. Mary's Hospital July 1. Menses had been regular both as to periodicity and length of time; but during the last months the flow was more free. She also bled between periods, a day or two at a time, especially after coitus. Pain was not present at first; laterally it has become a constant factor. Examination shows a large soft cervix, normal fundus and adnexa. The curetment showed soft scrapings from the cervix. Pathologist reported adenocarcinoma. The patient refused further operation.

CASE VIII.—Mrs. J. W. T., aged fifty-two. For several months menses had become more scant but much longer in duration and she would sometimes flow a little at short intervals for two or three weeks. For the last two months she has lost blood constantly. Before this she had noticed that intercourse, though painless, was always followed by slight bleeding. She had no pain. July 1, she was curetted. The laboratory findings showed carcinoma of the fundus. Five days later a panhysterectomy was done. The uterus was normal, though small in size. Cervix and adnexa normal.

Two of the last series of cases show that youth is not exempt. All show the necessity of routine examination of curetings. Three of the cases would have gone on to a hopeless development of the disease had this simple measure not been adopted.

The limits of this paper permit me to call your attention only to some of the more common forms of suspected malignancy. I have not spoken of the class of cases which are associated particularly with menorrhagia; nor have I referred to the menorrhagia due to myomata. All of them may be diagnosticated by the character, quantity and time of the bleeding. The above cases are detailed to illustrate the object of the paper and to show how easily they may be found when we look for them. Six of the cases have occurred in my recent service at the two hospitals with which I am connected. I desire to express my appreciation to Dr. A. O. Brown of St. Mary's Hospital, who assisted me in the case records here submitted.

Since writing the above paper, Mrs. H., of Florida, aged forty-four, was referred to me with a history of normal menses and generally good health until six months ago. She ceased to menstruate at that time but this was followed by a discharge which has remained offensive up to the present. Examination shows considerable of a growth in the left parametrium. Visual examination shows the cervix is almost entirely sloughed away and a carcinomatous mass exists all over the vaginal vault. I only add this report because it has bearing upon the necessity of educating women to seek the advice of a competent physician at an early date.

CONCLUSIONS.

1. Information should be disseminated among the public concerning the early signs of cancer.

2. The cases here reported, with few exceptions, indicate that the malady is not recognized as early as it should be, even by physicians.

3. All uterine or supposed menstrual bleedings, which are unusual, should command our keenest attention and observation.

4. All curetings should be submitted for examination to a competent pathologist.

5. Pain has no part in early cancer; it is a complication and only follows after the disease has developed.

6. There is no "cancer age." Too much emphasis has been placed upon this point in text-books. Most of the cases referred to were among the young women.

7. Microscopic examination is the sovereign method in the diagnosis of cancer. Its use can be dispensed with only in those cases in which the cervix is open and the protruding mass is, beyond a doubt, carcinomatous; or when a digital exploration furnishes conclusive evidence of malignancy.

1360 Fort Street.

COMBINED LOCAL AND GENERAL ANESTHESIA IN MAJOR SURGERY.*

BY

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The *raison d'etre* for the present rather extensive discussion of anesthetics is not difficult to understand. Those who have carefully perused the numerous contributions to the literature of this subject during the last few years have surely observed the argumentative manner by various writers concerning the method and agents in vogue for the induction of anesthesia in major surgery. For many years chloroform was the anesthetic of choice in the west and south, whereas, ether was accorded preference among the northern and eastern surgeons, but neither agent proved invariably satisfactory to both operator and patient, the reasons for which will be later more fully outlined.

It is an important surgical axiom that he who is permitted to perform operations upon the human being, fails in the performance of his whole duty unless he shall adopt every known safeguard which offers increased safety to the patient. The duty of the surgeon and his responsibility to the patient demand the adoption of methods which entail the least danger to life.

While specific discussion of the merits and demerits of chloro-

* Read by title before Annual Meeting of the American Association of Obstetricians and Gynecologists, Buffalo, N. Y., Sept. 15, 16, 17, 1914.

form and ether for the induction of anesthesia would be inadmissible in this paper, there are certain features in connection with both agents, particularly with reference to the mortality and the dangers incident to their administration, which it is believed may be legitimately included. It was formerly quite generally believed that ether was distinctly more dangerous than chloroform, because of the well-known postoperative effects and its action upon the kidneys. However, available statistics show that the average mortality from chloroform is one in 3000, whereas, that of ether is one in about 30,000 administrations. The action of both drugs is through absorption by the lipoids; both lower blood pressure, both produce marked depression—in other words, their administration is accompanied by manifestations identical with those recognized as due to shock. Chloroform has a particularly deleterious effect upon the parenchyma of various organs, producing fatty changes, and that its effect upon the kidney is not less harmful than ether appears to have been definitely established.

In some respects the administration of ether is attended by infinitely less danger than chloroform, the remote effects have however been long recognized. The immediate dangers from its employment have been less thoroughly investigated. The essential cause of death during ether narcosis is from paralysis of respiratory function, but this accident is exceedingly infrequent when compared with cardiac failure resulting from chloroform. Although ether is less toxic than chloroform, the fact remains there are certain circumstances under which it is contra-indicated as a general anesthetic, and chloroform or some other agent must be substituted.

As early as 1800 Davy discovered the anesthetic properties of nitrous oxide when inhaled, and made the following suggestion as to its employment in surgery: As nitrous oxide, in its extensive operation, seems capable of destroying physical pain, it may probably be used with advantage in surgical operations in which no great effusion of blood takes place. His suggestion, however, remained unheeded for more than half a century.

The development of popularization of local anesthesia (including spinal analgesia) may be largely attributed to the dangers and unpleasant sequelæ incident to the administration of general anesthetics. While local anesthesia, *per se*, may not be ideal, it has a definite place in surgical practice and should always be accorded serious consideration in finally determining what is best for the interest and ultimate safety of the patient.

Those familiar with the subject no longer doubt that surgical operations of the greatest magnitude may be safely and successfully performed under local anesthesia, and by using novocaine (large quantities of which may be injected without fear of lethal dosage), according to Braun, et al., it has been possible to resect jaws, perform nephrectomies, herniotomies, and almost every other type of major surgical operation. In Braun's method of local anesthesia (the *bloc a distance* of the French), novocaine is injected well beyond and around the proposed operative field. The writer has on several occasions employed this method with the greatest satisfaction, although it is recognized that it has limitations and objections just as have other methods of inducing local anesthesia. Novocaine may be used in 1/2 to 1 per cent. solution (Braun), to which should always be added a small quantity of adrenalin, both being carefully sterilized. Of the 1/2 per cent. solution 200 to 250 c.c. can be injected without the slightest toxicity. The injection should be made twenty to twenty-five minutes before beginning the operation.

In this connection the questions seem pertinent, (*a*) what is the principal objection to local anesthesia, and (*b*) to general anesthesia? In addition to other dangers already mentioned, ether and chloroform are markedly depressing, *i.e.*, they produce shock. To a less extent this is true of all other inhalation anesthetics, with the exception of nitrous oxide. Local anesthesia is eminently satisfactory under certain circumstances, but is inapplicable to many classes of surgery, and therefore cannot be employed to the exclusion of other means.

It has been amply demonstrated by Crile that the ideal plan is a combination of local and general anesthesia, which he has termed the "anoci-association" method. The primary object of either local or general anesthesia was to permit the surgeon to complete the required operative procedure without the necessity of inflicting either physical or mental anguish upon the patient. Therefore, the selection of a satisfactory anesthetic becomes a question of paramount importance. In addition to the dangers previously outlined, the shock entailed by the administration of chloroform and ether, particularly if prolonged, is familiar to every experienced surgeon. That there occurred severe shock to the nervous system through the special senses from the operation itself, has also been noted and commented upon by various observers, and numerous ineffective methods have hitherto been suggested for its prevention; but not until the introduction of the "anoci" or combined method of anesthesia has surgery been possible without more or less psychic influence, especially where prolonged operations upon vital structures became necessary. While the psychic effects may not invariably result disastrously to the patient, in emphasis of the fact that this is not infrequently true, it is only necessary to state that oftentimes profoundly septic patients have perished shortly after leaving the operating-table where chloroform or ether had been used. As a matter of fact, it has heretofore been frequently observed that in certain types of cases demanding operation, the administration of a general anesthetic practically meant the death of the patient. Not an uncommon observation has been that septic patients, where life-saving surgery was imperative, did not recover consciousness after anesthesia, and succumbed within a few hours. Such patients left the operating-table profoundly shocked, clammy with perspiration, and in infinitely more serious condition than when the operation was commenced. These facts led many surgeons to adopt nitrous oxide for this class of cases. It was noted that even septic patients to whom this gas was administered would recover, or at least death did not so quickly follow the operation, and when a fatality occurred it was from the pathology for the relief of which the operation was undertaken, thus showing conclusively that in these unfavorable cases the anesthetic practically determined the outcome.

The comparative safety of nitrous oxide was demonstrated by the researches of Buchanan, who found after careful study of statistics covering many millions of inhalations of this gas that the mortality was probably about one in 5,250,000 administrations.

There can be no doubt as to the wisdom of adopting a certain definite plan of inducing anesthesia, and in all suitable cases strict adherence as a matter of routine to that particular method which has been found most satisfactory to the exclusion of others, is an important contributing factor to the safety of the patient. Moreover, as the anesthetist becomes more and more familiar with the method and the *modus operandi*, there is less likelihood of accident or error in administration, since by repeated practice perfection is attained in any branch of medicine. And of equal importance to the safest anesthetic is the "safest anesthetist."

This feature deserves most careful consideration. The anesthetist should possess adequate judgment and requisite skill, because his position in connection with the operation is quite as responsible as that of the operator. Virtually the anesthetist has entire control of the situation, and may at any time demand that the surgeon discontinue the operation even though it be unfinished. In some respects, therefore, the position of the anesthetist is of equal importance to that of the surgeon himself.

We believe that, properly administered by a competent and capable anesthetist familiar with its effect, nitrous oxide is the safest of all anesthetics for inhalation, but when improperly given or in the hands of the inexperienced in its administration, it is the most dangerous. An expert can prolong gas-oxygen anesthesia indefinitely without serious danger to the patient. If, however, an insufficient amount of oxygen be allowed, death ensues quickly from acapnia. It is therefore essential that there shall always be the proper admixture of oxygen, and this being assured, gas-oxygen in competent hands is the safest known anesthetic. Only an expert should be permitted to administer anesthetics under any circumstances, and no one can be legitimately considered expert unless he has had abundant opportunity for gaining experience and perfecting himself in that particular branch of medical science. It has been tritely remarked that no individual can be starved so long as sufficient food is allowed to sustain life; and an appropriate paraphrase would be, that no individual can be killed with nitrous oxide gas provided sufficient oxygen be permitted to maintain life.

The writer was among the first south of the Ohio River to adopt the combined method of local and general anesthesia in major surgery (gas-oxygen and novocaine, the anoci-association of Crile) as a routine measure in suitable cases. This method has been employed for over two years, in an infinite variety and sufficient number of cases to warrant the statement that all the claims made by its originator have been fully justified. In the language of the eminent surgeon Moynihan, "the discovery of the anoci-association method of anesthesia is one of the greatest achievements in the entire history of surgery."

The advantages of the combined or "anoci" method of anesthesia are manifold, one of the most important being the guarantee of maximum safety to the patient. Psychic influence (mental shock), likewise the operative shock (traumatic excitation), which have hitherto been prolific contributing factors to unfavorable ultimate results, are eliminated by this method of anesthesia. All communication is abolished between the operative field, *i.e.*, the painful area (fear excitor) and not only the conscious but also the subconscious perceptions of the patient, which literally signifies that all psychic factors that might otherwise exert a noxious influence are rendered inoperative. There is complete severance of all nervous connection between the special senses and the brain, resulting in absence of harmful (noxious) psychic influence, with subjugation of excitation which might arouse biologic associative memory of injury, and instead of the threshold of the brain being lowered to sensitive impression it is raised. The brain cells are not exhausted in their effort (through fear of danger) to escape the trauma, there being no communication between the operative area and the brain. And this communication is not re-established until the injury has practically been repaired, *i.e.*, until there is no longer any alarm transmitted from the area of trauma, the process being one of reconstruction rather than destruction. Brain perceptions are thus adequately protected from danger through every avenue; hence no pain, therefore no biologic fear; consequently no nerve-cell degeneration, therefore no shock.

Under the combined method of anesthesia in abdominal and pelvic surgery there is entire absence of straining on the part of the patient during the operation, and there being no necessity for the use of retractors, traumatic injury to the tissues is correspondingly minimized. There is complete relaxation and work is more easily done than under the ordinary ether anesthesia and certainly with a far greater margin of safety from the anesthetic standpoint. Contrary to the general belief there is no increase in hemorrhage under gas-oxygen anesthesia, such as sometimes occurs with nitrous oxide alone. Jactitation, muscular rigidity and cyanosis are evidences of improper administration; with the requisite admixture of oxygen the skin remains normal in color. There is absence of postanesthetic disturbances, such as retching, vomiting, intense thirst, and the fearful expression of anxiety so commonly observed under the older anesthetic methods.

Since adoption of combined anesthesia it has been possible to successfully operate upon many patients who would heretofore have been considered inoperable risks, *i.e.*, in aggravated cases of enlarged thyroids where the condition of the patient was desperate; patients with marked renal, cardiac and arterial complicating lesions; profoundly septic patients suffering from pathology demanding immediate surgery. The primary mortality in unfavorable cases has been materially reduced and in selected cases no immediate fatalities have occurred where the combined method of anesthesia was employed. The remote mortality has also been markedly lowered, with reduction of postoperative discomfort to the minimum. Patients do not complain of postoperative pain (the so-called gas pains, etc.), there is little or no abdominal distention, and altogether they are much more comfortable in every way than those operated upon under the older methods of anesthesia.

Briefly, the combined local and general method of anesthesia (anoci-association) may be described as follows: From a half hour to fifteen minutes before the operation the patient is given an hypodermatic injection of morphine and atropin, morphine and scopolamine, or morphine plain, dependent upon the judgment of the anesthetist. The patient is taken directly into the operating room where gas-oxygen is administered as the anesthetic. The field being prepared, the line of proposed incision is injected with a 1/4 per cent. novocaine solution. After incising the skin and fat, the fascia and muscles are likewise injected. The incision is then continued until the depth of the operative field has been reached. In abdominal surgery the peritoneum, after being opened, is reflected and injected beyond the line of incision with novocaine followed by quinine-urea-hydrochloride in 1/2 per cent. solution. The mesenteries are also injected with novocaine solution before their division. This is true of the intestines, the gall-bladder, the appendix, the uterus and the appendages. In renal surgery the injection is extended well around the kidney, although as a rule this organ, like other intra-abdominal organs, is not very susceptible to contact impressions. After the tissues have been divided, all suture lines and areas in the track of ligatures and proximal thereto are injected with the quinine-urea solution. Before the incision is closed, the muscles, fascia and skin are also injected with quinine-urea behind the proposed suture line. The novocaine solution must be well distributed by pressure before incising the tissues, and the quinine-urea solution should be injected well behind the operative field.

Nothing included in the foregoing should be construed as meaning that the combined method of anesthesia described is inapplicable to surgery in situations other than the abdominal and pelvic cavities. It is equally valuable and may be as advantageously utilized in the surgery of other regions where the administration of an anesthetic is required, *e.g.*, the writer has quite recently performed several radical breast operations under this method of anesthesia; in no case was there the slightest pain or discomfort following the operation, nor were the patients really aware that any surgery had been performed upon them. Even in those instances where for good and sufficient reasons gas-oxygen cannot be used as the anesthetic and ether has to be substituted, it is my practice to employ the "blocking system" with novocaine and quinine-urea, the latter being routine in all operations in a clean field.

The time factor in major surgery, upon which much emphasis has heretofore been placed, is not of such serious consideration when the combined method of anesthesia is used, since the most dangerous factor (shock) is thereby totally eliminated. Contrary to previous teaching, even under the older methods of anesthesia, the factor of time, *per se*, was important as a result of the shock induced by the anesthesia and not because of the surgery. It was at one time believed that hemorrhage and shock were synonymous, but the fallacy of this hypothesis has been amply demonstrated. The effects produced by each upon the brain cells are, however, similar in their significance.

In conclusion: It matters not what method be selected for the induction of anesthesia nor who the anesthetist, it must be obvious that neither the immediate safety of the patient nor the ultimate outcome depends solely upon these factors. The responsibility of the surgeon and his duty to the patient require that he shall not be lacking in either anamnestic erudition nor operative skill. Other important features are: The observance of the strictest aseptic precautionary measures and the handling of tissues not with haste but with tenderness and a loving care. The careful execution of every operative detail, and the maintenance of requisite hemostasis. Determination as to physical condition of the patient as an operable risk, and finally, the exercise of mature surgical judgment.

400 The Atherton.

Note.—In the preparation of the foregoing paper, the author has drawn liberally from material presented in former contributions. Vide *International Clinics*, vol. ii, Series 24, 1914, pp. 177–198; *American Medicine*, July, 1914, pp. 470–473; *International Journal of Surgery*, July, 1914, pp. 239–243; *Kentucky Medical Journal*, April 1, 1914.

PRIMARY CARCINOMA OF LIVER IN A CHILD.*

BY

MAGNUS A. TATE,
Cincinnati, O.

(With two illustrations.)

The following case report is, unfortunately, not complete, the diagnosis having been made clinically only. An autopsy was not permitted.

Patient, aged ten, female, small for her age. Family history: Father, aged forty-two, 5 feet 10 inches tall, weight 165 pounds, strong and healthy. Mother, aged (?), delicate, height 5 feet 2 inches,

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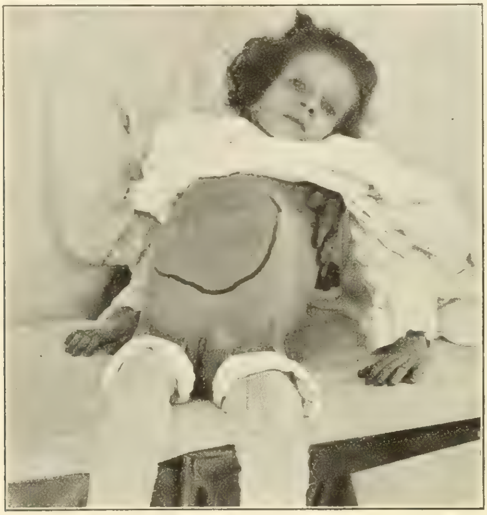
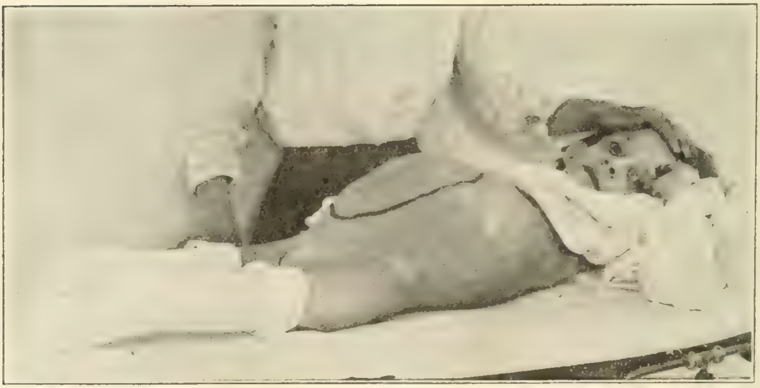
* Read by title at the Annual Meeting of the American Association of Obstetricians and Gynecologists, Buffalo, September, 1914.

weight 116 pounds, and looks tubercular. No history of carcinoma. Father's family negative as to tuberculosis; but the mother had a brother who died of tuberculosis following a long debauch. No specific history. There are two other children, aged two and six years respectively, both healthy.





Primary carcinoma of liver. (Two photographs of patient taken at the hospital.)

History and Examination of Patient.—Measles at the age of three, scarlet fever at nine, and two or three attacks of inflammatory rheumatism during the past two years. Patient has not been well since the attack of scarlet fever, and has been failing steadily for past six months.

The patient was first seen January 16, 1913. She was very pale, nervous, and cried almost constantly. The mother informed me that child complained of a constant pain in the right side of the abdomen, that it was very constipated, sleeps poorly and suffers incontinence of urine at times. Temperature, normal; pulse, 94. On examination of the abdomen a mass was easily seen and palpated over the region of the liver. It was hard to the touch and about the size of a cocoanut. Abdomen slightly distended.

Advised removal of patient to hospital for satisfactory study and observation; and, if deemed advisable, an exploratory incision. No positive diagnosis made. Parents refused to take the child to hospital and would not consider an operation.

In the latter part of March, 1913, I was again consulted, earnestly requested to take charge of the patient and to do whatever I deemed best. Patient was sent to Bethesda Hospital.

The tumor mass is outlined by a dark line in photograph. Examination revealed an anemic and cachectic child, very thin, and of waxy color. Weight, 60 pounds. An enormous mass extended from under the ribs of the right side over to the left and down nearly to the pelvis. It occupied about two-thirds of the abdominal cavity. Many physicians had seen the case since my first visit, and various diagnoses had been made.

Brief report of examination: *x*-ray unsatisfactory; blood examination simply showed marked anemia; urinalysis, sp. gr. 1020, reaction alkaline, trace of albumen, no sugar, a few hyaline casts, and phosphates in large quantity.

Lungs and heart negative. An operation at this time seemed out of the question. But the parents insisted upon, and I consented that at least an explorative incision be made under a local anesthetic. This, however, was found impractical. The child was very restless, screamed and cried so that we were forced to abandon our efforts at local anesthesia and resort to ether narcoses. On opening the abdomen to the right of the median line and near the umbilicus, a little brownish fluid escaped. The tumor proved to be an enlarged liver. The surface was uneven, very hard to the touch. It was of a reddish-brown color, showing, here and there, an elevated grayish nodule. The examining hand encountered a few adhesions easy of separation. The remaining abdominal organs seemed to be free from disease. No attempt was made to remove a piece from the liver for microscopic examination. I did not care to do more than make a clinical diagnosis at this time for fear of an uncontrollable hemorrhage and a section of it might be obtained later. The child did not seem any the worse for explorative incision. Pulse remained about 100, and temperature normal. She rallied nicely from the operation and did well for four days; after that she sank rapidly and died on the fifth day. Much to my surprise and chagrin no autopsy allowed. My diagnosis was primary carcinoma of liver.

I find that Castle (*Surgery, Gynecology and Obst.*, April 19, 1914) has written a very comprehensive article on "Primary Carcinoma of

Liver in Childhood" and he concludes by saying: "There are reported in literature forty-two cases of cancer of liver in childhood (under sixteen) with the majority of diagnoses accurately made." If my case was a true primary growth, and I believe it was, a rare affection was encountered.

THAT SYMPTOM LEUKORRHEA.*

BY

DOUGLAS HUNT STEWART, M. D., F. A. C. S.,
New York.

Although the theme is trite and has been worked over for centuries by physicians, yet, to-day finds a writer addressing an audience, that knows more about the text than its literature contains. There remains a single hope of arousing interest by pursuing an exploratory by-path and avoiding the beaten track.

If one wipes out a vulva and examines the "wipe", he may find germs, foreign bodies and most conditions that appear to be premises to an inference of sure infection. Environment is bad; but anticipated evil is contradicted by the vagina insisting on maintaining sterility, let its walls be sodden or shrunken and its discharges profuse or scanty. Collections (platinum loop) from the driest spots in the middle third of the canal have furnished the fewest specimens of the gonococcus when the cervix, little vaginal pools and vulvar pockets have yielded abundant material for culture purposes. Acidity of the soil usually means germ-repulsion, and "favorite habitats" imply that a neutral reaction has paralyzed the energy of all defensive factors. They are inert, no matter how intense their combined efficiency might be if the proper degree of acidity should prevail.

A curious smear-apparatus furnishes lubrication, when required, quite independently of the mural exudate. A dry tube, greased solely at its ends, together with a rather loosely fitting cork to be pushed through it, will afford a rough schema.

Secretion, the germ-inhibitor, is a blood derivative proportionate to the variations and development of the circulation. Mucus, a germ-protector, is a lubricator depending on the muculent production of certain glands. Anatomy says: "The mucous membrane has a few mucous crypts; but not true glands."

A glycolic acid is present in the vaginal flow in a maximum amount of 2 grains to the ounce, but abnormal conditions may change the

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* Read by title at the Annual Meeting of the American Association of Obstetricians and Gynecologists, Buffalo, September, 1914.

reaction to frank alkalinity; though even then, a careful dry-cleansing and subsequent trial with litmus, may make manifest an acidity that is merely concealed beneath an alkaline flow-coat of uterine origin. A common strength potassa test is 1/4 per cent.; this proves to be superior to 1 per cent. grape-sugar lactic acid when pitted against staphylo-streptococcus. Vaginal fluid proving four times as strong a germicide as an artificial, solution, led to the deduction that some synergist must be at work. Comparison with gastric juice shows there a surprisingly high resistance to putrefaction, a power which seems to be lacking with the vaginal flow which, to replace it, has direct external drainage.

My earnest thanks are due to the *Lancet-Clinic*, its business manager, its laboratory, the Cincinnati General Hospital and Dr. Thomas H. Kelly, who came to my aid with a corroborative report, from which this paragraph is quoted: "The uterovaginal secretion contains leukocytes, both intact and broken down. The antibacterial properties of it probably depend upon these liberated antibodies rather than upon the concentration of the lactic acid present."

The accidental appearance of yeasts need not be noticed. Deliberate probation as to their therapeutic value has caused a crop of rose-colored reports in which there is "no such word as fail" and success waits upon topical employment.

A "detail man" endeavored to correct my technic by explaining that the yeasts must be mixed with milk, allowed to grow for a week, and the vagina tamponed with the curds. The yeasts were not a factor, the process gave some results and the odor was a prohibitive stench. From the use of curdled milk (lactic acid) to experimentation with the Squibbs product was a natural step. Four hours after douching (2 drams to the quart) the acid content of the vaginal secretion dropped to one in 1000. Nature either did not wish so much lactic acid and shut off the patients supply, or the old dictum of Ringer still holds good that "acids diminish acid secretions." A grain to the ounce was often found after a similar use of acetic acid and this, upon trial, gave better clinical results than either lactic acid or soured milk with or without yeasts.

Leukorrhea is termed a discharge, not a disease. It may be a disease-carrier. Traumatism is the result of grave surgical injuries. Grave is not synonymous with extensive. Mosquitoes have killed more than lions; and solutions of continuity, from erosion, or cauterization, cause breaks in a defending mucous membrane, and thus open entrances to invaders as surely, if not as largely, as birth lacerations may. Should the sole invader be the gonococcus, a caustic might be the agent devoted to peeling off a sheet of membrane and including therein the germs of a surface infection, a hope that is not realized with a mixed invasion because removal of the membrane is a clearing away of an obstruction and a making smooth the pathway of peptonizing tissue-melters—the so-called pus producers. Therefore cauterization either cures by burning, or an infected burn ensues.

All wounds should be healed, especially invisible ones. Modern medicine is learning lessons from ancient domestic practice. The septic thumb (felon, etc.) inserted into the hollowed-out lemon, combined with copious drafts of "*Cream-er-tarter-lemenade*" is archaic. Lemon juice forms citrate of soda in the depths of wounds and amounts to citrate of soda when the blood is encountered by means of internal administration. The effects of citric acid upon brawny swellings is well known and the literature is ample. Before Lister's time vulneraries were much used. When his work was considered final they were deemed unnecessary and abandoned. A few years ago my acquaintances were experimenting with the application to wounds of fresh placental membranes, later extracts were used; their virtue was found to reside in allantoin. This gave prompt and good results when applied to cervical wounds, erosions, etc. Then I was furnished with a cheaper product made from uric acid and, finally, the importers sent me some made from comfrey root; the favorite ingredient of the early vulneraries. It is a splendid healer; but owing to the large amount which a single vaginal treatment demands, combined with its high cost, I was compelled to look elsewhere. My supplies have been turned over to surgical friends who will furnish further news of its use. After experimenting with Wright's solution, the one in use in the surgical clinics of the J. Hood Wright Hospital was added. Then there followed a good deal of study with various solvents (glycerin, oils, etc.) because water is detrimental to a mucous membrane. Kaolin and various insoluble powders were tried.

Eventually, and from work upon another subject, came a question of osmosis and specific gravity, to wit, "Since dehydration is dependent upon the response of a patient's tissues to the demands of an external and higher specific gravity upon internal fluids, therefore, molasses must be more powerful than glycerin if its specific gravity were greater." It proved to be so; but the dark staining involved caused the use of sugar, a substance which is converted into lactic acid by a lactic acid secretion. Milk sugar possesses the single advantage of not forming lumps. This has not been a matter of importance.

Cane sugar, milk sugar and glycerin, increased the specific gravity of the vaginal fluid from 1010 to 1300, 1250 and 1200. Saturated solutions compare with glycerin as 1350 and 1300 to 1250. And the solid sugars as 1600, and 1500 to 1250. The vaginal fluid averaged 1012 with a minimum of 1010 and maximum of 1016.

When the discharge continues unabated after repairs, electricity, cauterization, hydrotherapy, etc., then this régime has been successfully adopted. Order the patient to drink:

1. On rising, a pint of cream of tartar lemonade.

2. An additional tumblerful of plain lemonade (two lemons) after each meal. No. 2 should be observed only if there are masses or swellings in the broad ligaments.

3. On Monday, Wednesday and Friday apply the following powder, using a small spoon introduced through a speculum: ℞ Sublamine gr. ii. Sod. Cit. ℈ii. Alum, ʒiii; Sod. Chlorid, ℥ss; Plumbi Acetat., ʒvi; Sugar q.s. ad lb. i. Cover cervix and fornices and tampon lightly The powder blower is a failure owing to back draft. Leave tampon in place twelve to twenty-four hours. Sugar pushes up the specific gravity, causes an increased secretion which converts the whole powder into Wright's solution plus aluminum acetat plus white lead. An object lesson, with ocular proof of its efficiency, will be furnished by its application to any external, preferably septic, wound or burn. Secretion in the vagina is increased, but becomes clear and watery. In treating the profuse flow occasionally found at, or after, the menopause, the mucous membrane must be fed and not dehydrated. Thymol iodide in cod-liver oil (10 per cent.) is as good here as upon sluggish wounds of old people, and neither gumma nor cancer contraindicate its use. This treatment can be alternated with the acetic acid douche twice a week, and the use of the powder once a week.

In the senile form of leukorrhea the administration of iron was of trifling advantage, three patients had an adverse idiosyncrasy, and one teaspoonful of the syr. hypophosphite of lime before, with 1/25 grain of arsenic iodide after each meal, were substituted with happy results. Gout, rheumatism, lithemia, mild scurvy and urticarial tendencies were magnifiers of vaginal evils; but the two remedies, plus lemon juice, seemed to improve them all.

4. On Tuesday, Thursday and Saturday the douche of acetic acid (36 per cent.) is advantageous (ʒi or ʒii to qt. i).

Iodine, carbolic, silver, etc., appear to lose some of their harshness when used in conjunction with the powder; but when the powder is used alone it preserves and reinforces the patient's defensive powers;

it increases her secretion because of its superior specific gravity. This is quite a different matter from stimulation with an irritant that tears away nature's shield of epithelium and opens the subepithelial spaces. Osmosis, acidity and antibodies delivered from tissues that are soothed and repaired by a tranquilizing vulnerary, which is also an active germicide, might broadly be termed "aiding nature." On the other hand, sincere, conscientious attempts at obtaining asepsis through the employment of irritant applications, produces a harvest of damage and inflammation.

If a given case has been untreated, maceration and erosion must depend on the destructive potency of the discharges. As these often emanate from intrauterine infections, their sources should be attacked; but even here it is sometimes surprising to notice the change for the better, in both discharge and uterus, which will promptly follow the adoption of the measures which have been indicated.

128 West Eighty-sixth Street.

IN MEMORIAM.

DR. AUGUST E. CORDES.

BY

E. GUSTAV ZINKE.

(With portrait.)

Dr. August Elisee Cordes, whose death occurred August 4, 1914, was born at Lyon, France, September 25, 1843. He graduated in medicine from the University of Paris and received his degree in 1869. He took special courses in obstetrics and diseases of women at Dublin and Prague. When, in 1870, the war broke out between France and Germany he returned to his native land, served in the Army Medical Corps, and rendered distinguished services for which he was decorated by the French government. At the close of the war he settled in Geneva. When the Medical Faculty of Geneva was inaugurated, he was made "privat docent" in obstetrics. I 1886 he was made "Chirurgien-adjoint" of the Obstetrical and Gynecological Clinic at the Maternity at Geneva. Cordes was a frequent contributor to medical journals in France, England and the United States of North America. He translated, from the English,

AMERICAN JOURNAL OF OBSTETRICS
AND
DISEASES OF WOMEN AND CHILDREN
APRIL, 1915

AUGUST E. CORDES, M. D.

Born Sept. 25, 1843. Died Aug. 4, 1914.

Barnes' Lessons on Obstetric Operations and Barnes' Treatise on Female Diseases. Cordes was a frequent attendant of the International Congress of Medical Sciences. He was one of the general secretaries of the International Congress of Obstetrics and Gynecology at Geneva, 1896. He was an active member of the Medical Society of Geneva and of the Society of Obstetrics and Gynecology of Suisse Romaine. He was president of both of these societies. He was a Fellow of the Obstetrical Society of London, of the British Medical Association, of British Gynecological Society, and a Founder of the Obstetric and Gynecological Society of Paris. Thanks to his vast knowledge and splendid character, his discussions of papers and presentation of essays bristling with originality of views and expressions, he made many warm and admiring friends. During the past few years, on account of ill-health and severe suffering, he has been compelled to remain at his home. He passed away in the seventy-first year of his life, after great and prolonged suffering.

TRANSACTIONS OF THE WASHINGTON OBSTETRICAL AND GYNECOLOGICAL SOCIETY.

Meeting of December 12, 1913.

DR. MORAN *in the Chair.*

DR. SULLIVAN reported a case of

PREGNANCY AND CARCINOMA UTERI.

DR. J. S. STONE in discussing the case said that the interest was great on account of the rarity of the condition. He had one other case in which the woman was five months pregnant. He did an immediate hysterectomy. The carcinoma did not have as rapid a development as had Dr. Sullivan's case but there was recurrence. The technic of the operation was of interest because infection was to be expected in every case of abdominal Cesarean section with a dilated or open cervix so that the pedicle was usually treated extraperitoneally. In Dr. Sullivan's case the careful technic had avoided infection. The result of the operation was excellent and the operator to be congratulated on his success.

DR. MILLER had a case of cancer of the uterus with pregnancy some three years ago in which he had done a Cesarean section and then a Wertheim hysterectomy. The edema and relaxation of the tissues made dissection very easy. The child lived and as yet there had been no recurrence of the carcinoma. The case had been reported at the time but not published. As to the frequency of the condition there was estimated to be one case of carcinoma to complicate every two thousand labors. On the other hand in carcinoma of the uterus one in every hundred was pregnant. The increase in rate of growth of the carcinoma during pregnancy was expected and usually associated with increased bleeding. Carcinoma of the body of the uterus probably could not long coexist with pregnancy and carcinoma of the cervix frequently interrupted pregnancy so that few cases went to term. At labor rupture of the uterus was apt to occur and subsequent death from peritonitis or hemorrhage. Placenta previa was more common in cases of carcinoma. The labor was apt to be unusually long, five to nineteen days being not unusual. In one reported case pregnanacy had lasted seventeen and a half months. Carcinoma was not an infrequent cause of missed labor with maceration of the fetus. In treatment the prognosis for both the woman and the child had to be considered. In the cases in which it seemed possible to do a radical removal of the cancer a complete Wertheim operation should be done as soon as the diagnosis was made. At the period just before the viability of the fetus a delay of three weeks for such an operation might be justifiable in order to give the fetus a chance for life but a longer delay increased the risk to the mother too much. The difficulties associated with labor in such cases were always to be anticipated and Cesarean section done. The average gynecologist and obstetrician was not prepared to pass immediate judgment on the best method of treatment of such conditions.

Dr. Fry agreed with Dr. Miller as to the importance of immediate Cesarean section and gave him great credit for saving the lives of both mother and child in his case. In Dr. Stone's case the ultimate result would probably not have been changed even if the operation could have been done at an earlier date but it was a pity that the diagnosis could not have been made by the previous attendants, which might possibly have saved the mother which was in every case the most important consideration.

Dr. Abbe said the increased rate of growth of the uterine carcinoma during pregnancy was interesting in connection with some of the suggested recent tests for pregnancy and also for carcinoma, as the fields seemed to overlap and certain constituents of the blood were similarly modified in carcinoma and in normal pregnancy. It would be interesting to know if there were any statistics to show whether carcinomata in other parts of the body were more rapid in their development during pregnancy.

Dr. Carr called attention to the fact that all breast tumors grew more rapidly during pregnancy which was to be expected because of the increased vascularity.

Dr. Willson suggested that carcinoma of the nongenerative organs might be inhibited because of the protective bodies that were generated as shown by Abderhalden, that tended to conserve all the energies of the mother for the one purpose of maturing her offspring at the expense of the nutrition of the other organs of her body. He approved of hysterectomy in the cases where there was a reasonable hope of saving the mother but in the hopeless cases he did not see why a simple Cesarean section would not do as much ultimate good to both mother and child.

DR. MILLER said it was considered sufficient in the absolutely hopeless cases to do a simple Cesarean section with drainage through the cervix. But leaving in the uterus increased the risk of sepsis and mortality while amputation of the body of the uterus gave practically no more danger on account of the great ease with which such an operation could be done on the pregnant uterus.

DR. STONE thought leaving in the uterus in such cases more dangerous to the woman than its removal. The removal of the cervix was also very easy on account of the marked relaxation.

DR. SULLIVAN in closing called attention to the importance of the diagnosis of such conditions. He had seen Dr. Stone's case in the hospital ward and made a diagnosis of carcinoma but had failed to note the coexisting pregnancy. He considered it most desirable to remove the uterus in order to shut off the extension of the disease from the cervix.

DR. GEO. T. VAUGHAN read some

FURTHER NOTES ON A CASE OF HYPERNEPHROMA.

Just three years ago I reported to this society a case of hypernephroma, the patient being a woman thirty-four years of age and having what appeared to be an abdominal tumor of six months' growth. Operation revealed a tumor weighing 3 1/4 pounds, occupying the position of the left suprarenal capsule and pushing down the left kidney to such an extent that it finally came to rest on the right side of the body some distance below the right kidney. The tumor was removed, separating it from the kidney and the latter was restored to its normal position. Dr. J. F. Anderson, Director of the Hygienic Laboratory, kindly examined the tumor and sent me a report which reads as follows: "The following is the report of the examination of the tumor which you had diagnosed as hypernephroma. The examination and study of the tumor were made by Dr. Lovinder and seems to me to be a rather complete study of sections from various portions of the growth. ...The tumor is surrounded by a rather dense connective-tissue capsule which in several places is rather freely infiltrated with round cells. The growth proper is made up of cells, showing more or less of an alveolar arrangement. It is very vascular, shows hemorrhages in places, and the walls of the vessels are in most places made up only of a layer of endothelial cells upon which the cells of the tumor rest, sometimes in a more or less regular columnar arrangement. There is very little connective-tissue stroma but in places the cells show a somewhat open reticulated arrangement.

The cells, especially toward the center of the growth and more or less through it, are necrotic and breaking down. In some sections practically no cells can be distinguished; just a disorganized mass of dèbris. Staining with Sudan III shows some of this change to be fatty. The character of the cells making up the tumor varies a great deal, but in general they have a characteristic resemblance to the cells of the adrenal gland. They vary greatly in size, shape and staining reactions. Some are cuboidal in shape, their protoplasm stains with eosin, their nuclei are fairly round, dense, and usually centrally situated. Others show more vesicular nuclei with a more or less sinuous cell border and a protoplasm which does not take the eosin stain. The size of all the cells varies greatly. There seems to be no active reproduction of cells going on. There was found no evidence of any structure in the tumor in which the growth might have originated. Its structure throughout is as above described, as judged from several sections made from various parts of the tumor. Spots of yellowish-brown pigment are noticed occasionally in the sections. Tubercle bacilli could not be found in appropriately stained sections. From the appearances presented little can be inferred as to malignancy, but such inferences as can be made are of a negative character."

Prompt recovery followed the operation, the patient became pregnant, and was delivered without trouble of a boy about one year and a half after the removal of the tumor. She continued in good health until June, 1913, when she began to lose appetite and strength and in August she noticed a small growth under the upper part of the scar. On examination in the latter part of August, the patient looked well but on palpation a nodule about 1/2 inch diameter could be felt beneath the scar, deep in the tissues; also a good sized mass which was taken for the enlarged kidney and the diagnosis of recurrent hypernephroma was made and operation performed without delay. Incision was made in the scar exposing a mass and several somewhat detached nodules, surrounding the kidney and involving the peritoneum. The entire mass with its extension into the peritoneum was removed as thoroughly as possible, but in doing so the descending colon was accidentally divided. Immediate end-to-end anastomosis was made, telescoping the upper end into the lower for about 1 inch, using three staple sutures to draw the upper end in and tying these sutures on the surface of the lower segment. A row of sutures was then inserted to unite the end of the lower segment to the outer surface of the upper at the point of contact, all of silk. The wound was closed, leaving room for a large piece of iodoform gauze to protrude.

Convalescence was somewhat prolonged about three months. A small fecal fistula formed four days after operation but this healed spontaneously in about five weeks, but a small granulating area in the skin was nearly two months longer in healing. At present the patient looks and feels in the best of health.

Following is Dr. MacNamee's report on the microscopic examination of the tissue removed.

"Kidney and adjacent structures. Gross appearance: Kidney about 6 inches long and 3 1/2 inches in transverse diameter . . . Cut surface shows some congestion—otherwise normal. A soft gelatinous mass, the size of a man's fist adherent to the kidney along the posterior and lateral borders and extending in front along the ureter which it occludes at a point 2 inches from the hilum At this point the growth was more compact and firm. Numerous small fragments accompanied the specimen.

Microscopic Examination.—Round cells supported on a delicate reticulated stroma through which delicate capillaries course confined by the tumor cells and in areas by the stroma. Tumor cells show no definite limiting membrane. Those in resting stage have large dark staining nuclei.

About one-half the number are in process of indirect division. Some areas show well-developed fasciculi of fibrous tissue. In places this flattens to a narrow band surrounding groups of the above described cells exhibiting an alveolar appearance. Areas of degeneration (hyaline) are numerous.

Diagnosis.—Presents little difficulty as to its malignancy. As to its generic status, no satisfactory classification is at hand inasmuch as tumors of this body presenting typical or as in this case, nearly typical carcinomatous histological arrangement, have appeared as metastases in distant structures as typical sarcomata."

The hypernephroma seems to be one of those tumors of peculiar structure and behavior, belonging strictly neither to the class of carcinoma nor sarcoma, although at times it acts as a malignant growth, spreading through the lymphatics or blood-vessels and producing metastases in distant organs such as bones, lungs, etc., at the same time the secondary, as well as the primary growth presenting the histology of the adrenal gland. Cases have been reported in which the thyroid gland produced metastases, neither the thyroid nor the secondary growths showing any signs of the structure of cancer or sarcoma only normal thyroid gland structure, and yet being tissue and cells out of their normal limits, they act as malignant growths. The case reported is especially interesting on account of the local recurrence and the fact that so far there is no evidence of metastases.

Dr. Fremont Smith reported the case of a patient who had been under his care for twenty years and on whom he had made routine semiannual examinations; in May he had made such an examination and although the patient was losing weight and health no cause could be ascertained. In July, however, there was found a large mass on the right side between the ribs and the iliac crests. She had been operated on by Dr. Mixter of Boston, who found an enormous dislocated kidney which certainly had not all grown in the time after the last examination in May but had been pushed down and become palpable. At the time of operation she had weighed 96 pounds and now she weighed 115 pounds. As to the pathological diagnosis one man had said sarcoma and another hypernephroma. He wished merely to emphasize the importance of routine complete examination at regular intervals as a means of making the earliest possible diagnosis of disease.

Meeting of January 14, 1914.

DR. MORAN *in the Chair*

DR. T. E. NEILL presented a case of

CYSTOCELE WITH RELAXATION OF VAGINAL WALLS FOLLOWING HYSTERECTOMY.

Mrs. K., age fifty-three. Married. Was operated on in November, 1912, for fibroids in uterus by supravaginal hysterectomy.

November 7, 1913. Examination shows a well-developed woman 5 feet 10 inches tall, weight 160 pounds who complained of severe dragging sensation in pelvis, with backache, frequent urination and a tumor protruding through vulva when standing.

Examination of this tumor which was the size of a large hen's egg shows it to be a typical cystocele with marked relaxation of both anterior and posterior vaginal walls. Operation advised.

This was done on November 14, 1913, a wide anterior colporrhaphy and a deep perineorrhaphy, then the abdomen was opened, hoping to find the stump of the cervix or the round ligaments long enough to be attached to the fascia of the abdominal wall, this was impossible on account of the atrophy which had taken place and all that could be done was to bring the round ligaments behind the stump of the cervix and suture them with linen thread.

My object in reporting this case is to call attention to the fact that removing the uterus for fibroid tumors and prolapse with relaxation of the vaginal walls, will not produce a cure and that we should examine the vaginal outlet more carefully before proceeding with the removal of the uterus.

DR. MILLER in discussing the case said that while hysterectomy for prolapse usually failed in the expected relief of the condition, Dr. Neill's treatment by tightening the vagina, closing the sphincter vagina and levator ani muscles and suturing the cervical stump would probably supply the needed support. He thought that prolapse was best treated without removing the uterus.

DR. STONE asked about the conditions of the previous operation. He thought the vaginal outlet should be examined in all fibroid cases before the operation for the fibroid and the outlet repaired at the same time if desirable. He felt that he personally overlooked this point in his own work too frequently, because he was apt to leave the diagnosis and line of treatment in the ward cases to be determined by the interne. The operation of hysterectomy for prolapse does not attack the essential point. The main factor in the prolapse is not the weight of the uterus but the relaxation of the ligaments. Leaving the cervix seemed to help support the bladder. Polk had suggested an operation narrowing the vagina from above after separating the bladder from the uterus which offered good results. Dr. Neill's suggestions were also good.

DR. WILLSON presented a case of

PLACENTA PREVIA TREATED BY CESAREAN SECTION.

On the 8th of last April Dr. Russell Verbrycke referred to me Mrs. N. D. W., whom I saw that morning for the first time. The patient was pregnant for the fourth time. She had one child eight years old, one six years old, and gave a history of a miscarriage at the second month, cause unknown, just three years prior to the time of examination. During the summer of 1912 she had noted a tendency to menorrhagia and her period beginning on the 10th of September was about a week too soon. This proved to be her last period and the pregnancy apparently progressed normally, with the exception of considerable pain and tenderness in the lower abdomen, until the 24th of December, when there was a slight spotting noticed for the first time. On the 25th a small, very dark clot about the size of a hazelnut was passed, and there was a slight spotting for the next three days. On the 1st of January there was also some very slight bleeding. From this date there was nothing abnormal noted until the 8th day of April when the patient noticed quite a large blood stain on her gown when she got up in the morning. This history strongly suggested placenta previa and the following day vaginal examination disclosed the presence of a partial previa on the right side of the cervix. The examination provoked a rather free bleeding, and the vagina was packed immediately and the patient taken to the hospital. The cervix was sufficiently dilated to admit one finger readily.

The nature of the condition and its dangers to both mother and child were fully explained to the parents and they elected to delay delivery in the interest of the fetus. The patient was kept in her bed a good part of the time but was allowed to be up in a chair a part of each day. When the weather permitted a daily sun bath in a rolling chair on the roof was ordered, for the tonic effect of the fresh air. Despite this management a slight sero-sanguinolent discharge was more or less constant, worse on some days, better on others. The first part of May the bleeding became more pronounced, despite rest in bed, and the hemoglobin per cent. fell to sixty. It was felt that delivery could be no longer delayed. The great danger to the baby of the commonly employed method of delivery by version was explained to the father and delivery by Cesarean section advised and agreed to. As far as could be ascertained by auscultation and palpation the fetus was in good condition and of average size for the estimated duration of the pregnancy, namely thirty-five weeks, as the operation was done on the 13th of May.

The operation itself presented no difficulties. The placenta previa occupied the right lower posterior quadrant of the uterus and was of the partial variety. The hemorrhage from the uterine incision was slight and, as usual the drainage from the uterus was less than normal. The patient made an uninterrupted recovery and left the hospital in less than three weeks.

The baby weighed 6 pounds, 9 ounces. It was considerably cyanosed at delivery but respiration was readily established, the cry was lusty, the circulation apparently in excellent condition, and nursing was vigorous. There was no evidence of a degree of prematurity likely to cause serious difficulty. Nevertheless the baby suddenly became very cyanosed about forty hours after delivery, attempted to cry and died very promptly. It was thought that death was due to thrombosis or embolism but a partial autopsy failed to reveal any detectable cause.

This case is reported not because it is unusual or of any particular value, but in the hope that it may open a discussion on the place of Cesarean section in the treatment of placenta previa. Is it justifiable, as in this case, to do an abdominal section for the delivery of a multiparous woman at the thirty-fifth week of pregnancy with a dilatable cervix covered by only a partial placenta previa?

Dr. Sullivan thought that Cesarean section for the sake of the child certainly offered better prospects than delivery by the normal route.

Dr. Miller thought that the use of Voorhees bags were frequently the method of choice. Dr. Voorhees said that Cesarean section had no place in the treatment of placenta previa but Dr. Miller was not so radical. He thought that the bag would frequently control hemorrhage and the resulting labor gave excellent results. He did not consider that the dangers of a Cesarean section case were over after the operative recovery because the chances of rupture of the uterus in a subsequent labor at the site of the scar were certainly greater than in the normal uterus. The patient's choice of the method of treatment depends on the arguments that are presented.

Dr. Stone took issue with Dr. Miller on the line of treatment. He considered that when two lives were at stake from hemorrhage the control of the bleeding should be as absolute as one could make it. The diagnosis of central or marginal placenta previa was not always certain and he did not think that the hemorrhage from a central placenta could be controlled by the Voorhees bags.

Dr. Vaughan had had three cases of placenta previa with the loss of two babies. He thinks that he would do the Cesarean section and save all the mothers and all the babies. He did not think the bag dilatation as safe for the mother as the Cesarean operation.

Dr. Bowen thought that in primipara Cesarean Section was the choice. He had had two central placentæ previæ in multipara and in each saved mothers and baby by Cesarean section although one of the cases had been complicated by eclampsia. In many of the cases of partial placenta previa rupture of the membranes caused the head to come down and hemorrhage to stop so that delivery was very simple.

Dr. Vanrensalear asked if the compression of the placenta by the Voorhees bag did not interfere with the circulation in the infant.

Dr. Miller said that in marginal cases the bag pressed on the edge of the placenta that was already free from the uterine wall and so did not materially interfere with the circulation to the infant. The statistics and reports from the big clinics were not in favor of the Cesarean section.

Dr. Willson had seen five cases in the past fourteen months. In two cases the classical treatment had been the cause of death of two children each weighing over 9 pounds and in perfect condition. One of the women was exsanguinated and there was nothing else possible to do. He thought the risk to the child's life by the use of the Voorhees bags was too great to warrant its routine employment.

The mortality of the mothers whether treated by version or section was about 5 per cent. while the fetal mortality for the section was practically nothing, and after version very great.

DR. J. WESLEY BOVEE presented a specimen of

RUPTURED EARLY TUBAL PREGNANCY

with a history as follows: Mrs. E. Mc—, white, twenty-eight years of age, was seen in consultation with her husband, a surgeon in the U. S. Army, October 26, 1913. She had had one child, now about eight years of age, and one abortion at five months in 1908 from an unknown cause, one in 1911 at two months from overexertion and a third in 1912 at two months from an unknown cause. The labor in 1905 was terminated after forty-one hours by extraction by forceps; she made fairly good recoveries from each pregnancy; menses began at thirteen years of age, were never regular, varying several days in time of appearance. Before her first pregnancy had severe pain at each period, but since then it has been very slight; leucorrhea has been profuse since the second abortion. Her last normal menstrual period began August 28 while on a steamer coming from Alaska and lasted three to four days. About October 1 her leucorrhea became much more profuse and she was much annoyed by itching of the vulva. Severe backache and metrostasis began the 6th. The flow, lasting three days, was less in amount than at a menstrual period and had a very offensive odor. A slight loss of fresh blood for one day began the 12th. Several days later this last experience was repeated. On the night of the 22d a slight amount of flow occurred. The 23d had a sudden, sharp pain in the lower right abdominal quadrant accompanied by vomiting, faintness, dizziness and slight metrostasis. Her husband gave her ergot and an enema and applied ice locally to the abdomen. The pain continued until I first saw her on the 26th. The condition was obscure at the time but a very slight fullness above the right ovary, and exquisite tenderness at that joint together with the history of the last two months led to a prompt diagnosis, despite the history of three abortions. That evening she entered the hospital. Operation next morning, curettage, right salpingectomy, appendectomy. Thickened mucosa removed thought to be a decidua. When the abdomen was opened a considerable coagulated blood of a dark color appeared. Both ovaries and the left tube appeared to be normal. The right Fallopian tube at about 1 inch from the fimbriated end was found ruptured, and from this was protruding a very small structure, thought to be a decidua and with a very small fetal sac; no adhesions noted and no appreciable increase of size of tube at point of rupture observed. Vermiform appendix 3 inches long and peritoneal coat of it had a normal appearance. Doctor Craig of the pathological Museum of The George Washington University, has been kind enough to prepare the specimen by his interesting method and has succeeded in clearly showing its details very distinctly. From the small size of the tube, as well as of the opening in it and of the gestational structures one is inclined to infer the pregnancy was of but two to three weeks' duration. The operation was performed fifty-nine days after the last menstrual period but disturbance of the pregnancy had begun thirty-nine days after the beginning of the last normal period. If the gestation products appear to have been developing a shorter period of time may it not have died some days or weeks before the time of rupture, and may not this change have been acting like a foreign body, as an etiological factor in the rupture of the tube. Are we certain the trophoblast promptly ceases its destructive action on the tube wall when life ceases in the fetus.

Meeting of February 13, 1914.

DR. MORAN *in the Chair.*

DR. D. W. PRENTISS reported a case of

ACUTE PERFORATION OF THE STOMACH.

The patient, a man fifty-eight years of age, a clerk, two years before had symptoms suggesting ulcer of the stomach, the symptoms lasting more than a year.

He entirely recovered and returned to work the last week in March. From then until the perforation occurred, he was free from all gastrointestinal symptoms and believed himself in perfect health.

On Dec. 5, 1913, he went to work as usual feeling perfectly well; his breakfast was a moderate one, such as he usually ate, and it caused no unpleasant symptoms. At 11 A.M. while working he was seized with the most severe pain he had ever known, it was in the right upper quadrant of the abdomen and was so severe that for half an hour he could do nothing. When the acute pain subsided somewhat he took the street car home. Shortly after arriving home the pain returned as before, and from this time until the operation it did not cease, although it eased up every few minutes. The posture causing least pain was sitting on the edge of a rocking chair, bending forward each time the sharp pain returned. Board-like hardness of the abdominal muscles was present and never relaxed.

A physician was called in about 5 P.M. He knew nothing of his attack in February and made a tentative diagnosis of intestinal obstruction, and gave a high enema from which there was no return. At 7 P.M. Dr. Prentiss saw him and made a diagnosis of perforation of the stomach.

At 9 P.M. Dr. W. P. Carr opened the abdomen and found a perforation of the anterior wall of the stomach near the pylorus that was large enough to admit a lead pencil. The peritoneum was moderately inflamed and the cavity contained a large amount of cloudy serum.

The edge of the ulcer was trimmed and sutured; a posterior gastroenterostomy was performed and the patient was returned to his room in good condition. Shock was not marked and he did well for the first twenty-four hours. The urine voided on admission to the hospital was loaded with sugar, which continued undiminished until his death. He died about forty-eight hours after the operation apparently from diabetes. An autopsy was not made.

I believe this man would have recovered from the operation if diabetes had not been present, for the perforation had existed only ten hours when it was closed, and the peritoneum while inflamed seemed to recover after the operation.

DR. WHITE said that if the patients were seen early the diagnosis of gastric perforation was easy from the tremendous rigidity of the abdominal muscles, so that the patient could not stand erect. Seen later, however, the differentiation from other conditions such as perforated appendix was not so easy.

DR. VAUGHAN reported several cases of perforated stomach ulcer one of which had been a recurrent case in which he had done a gastroenterostomy. In another case the absence of rigidity was a noticeable feature.

DR. SULLIVAN quoted Deaver as saying that a perforating ulcer should be operated on within twenty-four hours to cure the patient. Closure of the perforation was imperative and the gastroenterostomy should then be done if possible. He thought that all such cases should be done by the master surgeon rather than by the man of less experience.

DR. STONE spoke of the acuteness of some such cases reporting one case in which operation was beyond hope inside of twelve hours, the patient dying in fifteen hours. Many of the cases had the ulcer barricaded by the pancreas or the omentum. At operation, if possible he would close the pylorus in order to maintain the opening of the gastroenterostomy.

DR. LOWE called attention to the fact that many of these cases took the anesthetic so poorly that any extensive gastric work was hazardous.

DR. THOMAS KELLEY reported a number of

GALL-STONE CASES.

CASE I.—Mrs. J., seen at Providence Hospital with Dr. Clark in 1908, had been vomiting for three days. She had suffered with attacks of indigestion for eight years. Patient was a rather stout woman of about fifty years. Had borne three children; had never had typhoid fever. There was tenderness over the whole abdomen, especially over the right upper quadrant, but no great distention. The bowels had not moved for three days, except a small movement by enema immediately after the acute illness began.

A diagnosis of intestinal obstruction was made.

A right rectus incision was made above the umbilicus as it was thought from the symptoms that the obstruction was high up. The large bowel was empty and also a large part of the small. A lump was felt in the intestine and brought out of the wound. It was in the jejunum which it completely obstructed. An incision was made through the bowel and a large gall-stone removed. As the patient was in rather bad condition, having an aortic murmur, no examination was made of the gall-bladder except to feel a great mass of adhesions. This stone evidently ulcerated its way through the gall-bladder into the intestine.

CASE II.—Mrs. B., patient of Dr. Leech. She was white, married, had borne several children. I saw her first about September, 1907. She was then suffering with symptoms of stone in the cystic duct and gall-bladder and it was decided to operate under local anesthesia, because of a heart lesion. She entered Sibley Hospital, and, using 1 to 200 solution of cocain, an incision was made to the right of the median line. A dozen small stones were removed from the gall-bladder and one from the cystic duct. The gall-bladder was drained. She made an uninterrupted recovery.

In October, 1911, patient entered Georgetown Hospital with symptoms of acute bowel obstruction. She was in bad condition, but it was decided because of the extreme nervousness, to use a general anesthetic (ether). The obstruction was found below the jejunum, but not far. The stone was removed through an incision in the intestine. The patient died the next day.

I think an effort should have been made in both these cases to crush the stones and not open the intestine. Large gall-stones are usually soft and it is possible they may have been broken so they would pass on without injuring the intestine.

Intestinal obstruction from gall-stones is not uncommon. There is no doubt but that the stone does not go through the duct, but ulcerates into the intestine at some point where the gall-bladder is in contact, usually the duodenum.

I had one case where the stone had ulcerated through and a large one was half in the gall-bladder and half in the intestine. In the second case reported there was no history of great inflammatory disease about the gall-bladder after the first operation or evidence of gall-stones, the patient being comparatively well until the bowel obstruction.

That a gall-bladder containing several ounces of pus should give so little constitutional disturbance as compared with collections of pus in other parts of the body is probably due to the fact that there are no lymphatics in the gall-bladder wall.

In neither of these two cases had there been any constitutional symptoms giving evidence of a pathological process necessary for the ulceration through of a foreign body from a viscus into the intestine.

CASE III.—Mrs. V., referred by Dr. E. A. Sellhausen. Patient was a German woman sixty-eight years old, had borne three children. She had not had typhoid fever. She complained of abdominal pain and fever. She had severe attacks of indigestion during the past eight years, otherwise had been healthy. Her evening temperature was 103; morning 100.5.

Examination showed a woman weighing about 200 pounds; her abdomen was very distended, a large mass could be felt reaching from the liver to McBurney's point. This was very tender to pressure and descended with inspiration.

She greatly dreaded an anesthetic and after much persuasion consented to be operated upon under cocain. A right rectus incision was made just above the umbilicus. The immensely distended gall-bladder was not adhered to the abdominal wall, but was covered over with a very fat omentum. This was shelled off after some difficulty, owing to the pain the patient experienced from the slight pulling. After being well packed around, the gall-bladder was opened and about a quart of light pus removed with a few stones.

The patient had then become so nervous it was decided to put in a large tube, hoping the stones would be removed through it after a while. The stones did discharge through the tube for over three weeks when during an irrigation of the gall-bladder she had a bad attack of colic, after which bile come from the tube for the first time.

Patient was then very well, but the bile gradually ceased and quantites of pus discharged. Patient was urged to have a radical operation, but refused. Ten months after the operation she died of cancer of the gall-bladder.

Cancer of the gall-bladder is rather frequent and is another reason for early operation, for all cancers of the organ begin with gall-stones or at least they are present. It is also another reason for extirpation of all gall-bladders that are diseased beyond functional recovery.

W. J. Mayo found cancer associated with gall-stones in 2.25 per cent. in 4000 gall-bladder operations. Out of eighty-five cases reported only five of these were well after two to six years.

Kehr in a report of 1866 cases operated on, reports 290 with malignant complications; but he includes in this list cirrhosis and diffuse septic angiocholitis. From this number he had 78 per cent. of deaths.

American surgeons, who operate as early as a diagnosis can be made whether the gall-stones are giving much trouble or not, do not find so many cancers as Kehr reports in his series.

My patient had symptoms of gall-bladder disease for some years and the condition at operation showed the process had been present for a long time.

If the mortality of cancer of the gall-bladder is so high it is probable that even if my patient had submitted to an operation with general anesthesia and the gall-bladder removed, her life would not have been saved, but there is no doubt but that if the operation had been performed several years sooner, she would still be alive.

CASE IV.—Mrs. R., referred by Dr. Blake. White; sixty-one years of age; married; three children; had not had typhoid fever. I saw her first during the spring of 1912. She was then suffering with gall-stones and was having rather a high fever. She steadfastly refused operation.

In October, 1913, I was again called and found her again suffering abdominal pain and fever. She was a very fat woman, but the gall-bladder could be distinctly felt reaching to the level of the umbilicus. The temperature in the evenings was 104. Tenderness over the right upper quadrant was very great and patient seemed very toxic; there was little jaundice. Operation was refused again for seven days, but not improving she entered Sibley Hospital.

The usual incision, right rectus, was made. Immediately beneath was a walled-off abscess containing about a pint of foul-smelling pus. This was well wiped out and the gall-bladder could be seen at its bottom ulcerated through the end, a large stone appearing in the eroded part. The organ was freed from adhesions and removed. The cystic duct was much diseased and this also was removed nearly to the common. A tube was sewed into the stump with catgut, a cigaret drain was carried down a little further. The tube drained well, and the patient improved greatly for two weeks, was sitting up in bed, when she suddenly died; probably from pulmonary embolism.

This patient was very septic at time of operation. The abscess was outside of the gall-bladder and consequently the great constitutional disturbances and high temperature. There was only one stone which completely filled the gall-bladder. The wall of the gall-bladder was very thick and diseased and the organ was removed with the stone still inside. To have removed the stone and left the gall-bladder would have so mutilated the latter that it would have been useless.

Mayo says sometimes gall-stones ulcerate through the abdominal wall; probably this one might have if the patient could have lived long enough.

CASE V.—Mr. E. Referred by Dr. Cox. White; male; called to see him January 9, 1914. Patient forty years old; very thin; had suffered from attacks of indigestion for four years. Had never been robust and had never had typhoid fever. His temperature at the time, 10 A.M., was 100° F. Four days before he had been ill with abdominal pain and fever. There was a decided tumor at McBurney's point, extending well over the ilium. A diagnosis of appendicitis was made, and operation urged, but refused.

After two weeks, I was again called finding him in about the same condition except he was more emaciated and the tumor mass in the right flank was larger. He entered Sibley Hospital the next day and a McBurney incision was made over the tumor. A large abscess was opened into and over a quart of pus evacuated. The abscess cavity extended up under the cecum to the lower pole of the kidney. The cavity was swabbed out with gauze and five medium-sized gall-stones were found. The appendix was not found, but very little search was made owing to the toxic condition of the patient, and the very thick adhesions about the parts. He was drained through the flank and also through the abdominal incision with rubber tubes without wicks. The upper tube ceased to drain after five days and the lower after ten. He continued to improve.

This case is interesting only because he gave no history of gall-stone colic. He had suffered with indigestion and pain and was in general bad health, but had never had a typical attack. The first evidence of grave trouble was at the appendix and the mass was felt very low and close up to the ilium. He did not improve during the three weeks before operation except that his temperature for some days would be much below normal.

The abscess was postcecal except at its extreme lower end. From the evidence, I believe these stones must have ulcerated through into the intestine and either lodged in an open appendix or came down coincident with the sloughing off of the appendix. The largest stone is 1 centimeter in diameter.

CASE VI.—Miss Y. Referred by Dr. Suter. September, 1910. White; single; twenty years of age. Had typhoid fever at twelve years. Had been suffering with indigestion for the past year. For a week had been having great pain in the right abdomen with a moderate rise of temperature. There had been no jaundice. She entered the George Washington Hospital.

A high right incision was made, and twenty-three stones were removed from the gall-bladder and several from the cystic duct. The gall-bladder was drained, the patient making an uninterrupted recovery.

In September, 1913, she was again referred to me by Dr. Quick of Falls Church. She had been sent to the George Washington Hospital when I saw her. She was running a mild temperature and was having great pain over the right upper quadrant. An incision was made through the end of the old scar. The gall-bladder was not adherent to the abdominal wall, it was greatly distended with a clear mucopus. One large round stone was found in the cystic duct.

Kehr cites a case of recurrence of gall-stones seen by him. Four years before he had operated on a man of sixty years removing a single stone in the common duct. The man was well for three and a half years when symptoms of cholelithiasis appeared. At a second operation he removed a retroduodenal stone and found the liver cirrhotic. The stone seemed to be a typical instance of recurrence, but on section a foreign body was found in the middle about which the calculus was formed.

On microscopic examination the foreign substance was discovered to be a silk thread. He believes many examples of supposed recurrence would be found after microscopic examination to have a similar origin. He now uses catgut to suture the duct.

I am unable to tell if this was a case caused by some such means or was a stone overlooked at the first operation. The patient had no symptoms until two weeks before she entered the hospital the last time.

The multiple stones make it possible that a small one was overlooked, but several were removed from the cystic duct and a careful search was made even of the ampulla.

CASE VII.—Major M. Referred by Dr. Weaver. White; fifty years old. Had suffered with indigestion for two years and previous physician had diagnosed case, cancer of the liver.

He was emaciated, and deeply jaundiced. The liver was enlarged to 1 1/2 inches below ribs. He suffered pain, but had no rise of temperature. He entered Sibley Hospital, April, 1907. A number of stones were found in the gall-bladder, two in the cystic duct and one in the common. This latter was removed by an incision immediately over it. No attempt was made to close the incision in the duct. Careful search was made through the opening and no more stones found. A tube was placed in the gall-bladder and one down to the opening in the duct, the latter was removed after a few days as it had ceased to drain. After ten days the tube was removed from the gall-bladder. There was no intermission in the flow of bile from the wound and the stools continued to be clay colored. All his bile came from the wound and continued to do so until he was operated on again in October of the same year. For six months he had no bile in his intestine, but he gained 50 pounds in weight and although he suffered great inconvenience from the great amount of bile continually flowing over his abdomen, he could scarcely be persuaded to have another operation fearing all his old symptoms might return. He claimed to be in better health than he had been for fifteen years and thought it was because no bile interfered with his digestion.

At a second operation a medium-sized stone was found in the ampulla. The intestine had to be opened, the stone was found peeping from the duct and completely obstructing it. The duct was dilated with forceps; the stone removed and the intestine closed. In three days no more bile came from the fistula and his stools became normal.

Kehr says medical means suffice in at least 80 per cent. of all cases.

Kehr's mortality in uncomplicated cases is 3 per cent., in complicated cases 14.1 per cent., in malignant cases 78 per cent., which makes his total mortality 16.3 per cent.

The Mayos, who believe that no gall-stone is innocent and all gall-stones should be removed before they are complicated, show a mortality very much less 2.75 per cent. as do other American surgeons.

A gall-stone is as much of a foreign body as a bullet except the bullet may be sterile and become encysted, while a gall-stone is not sterile and is never in a place when infection may not at any time enter.

The time to operate is when it is found, except in certain complications, whether at that time it is giving trouble or not, and before it can do so.

The mortality from removing gall-stones from the gall-bladder before complications arise is practically nothing.

To remove a stone from the common duct is a much more dangerous procedure and shows a corresponding higher mortality, especially if jaundice is present.

The gall-bladder should be removed in all cases when it is inflamed and the walls thickened, or when from adhesions it is seen to have been previously diseased enough for the infection to penetrate its wall, or where it is shrunken. Any of these conditions are a menace to the patient's health and possibly life, and none will probably functionate again.

Gall-stones seem to be caused by an attenuated infection, which comes from the infected bile, the bacteria being carried to the liver through the portal circulation.

While it is possible for bacteria to ascend from the intestine by way of the common duct, yet we cannot remember that the upper intestine is comparatively free from bacteria and there is a constant stream of bile from the liver to the duodenum through which it would be difficult for infection to ascend.

It seems probable that gall-stones form in the gall-bladder. Mayo says he has never seen hepatic duct stones without evidence that the original disease had its source in infection of the gall-bladder or common duct, and the common duct involvement was always secondary to gall-bladder disease.

There is very little fever in the gall-bladder disease as long as the infection remains in the organ, but as soon as the common or even the cystic duct are involved, we have a rise of temperature with the usual pathological findings on operation, such as enlarged glands in the region of the ducts.

If a stone becomes impacted in the common duct we may get a sudden rise of temperature.

The function of the gall-bladder seems not to be a reservoir of bile for it holds so little in comparison with the daily out-pour of bile, which has been estimated to be nearly as much as the urine.

Halstead has shown that pure bile injected into the pancreatic duct will produce acute and usually fatal pancreatitis.

W. J. Mayo thinks that the gall-bladder removes the tension on the ducts and prevents the bile from entering the pancreatic duct in the ampulla of Vater. The gall-bladder also secretes mucus which mixed with the bile seems not to have a deleterious effect if forced into the pancreatic duct.

The gall-bladder seems then to be a protection for the pancreas, which is an argument against its removal. Gall-stone disease is found much more in women than in men. It is said that nine-tenths of women who have gall-stones have borne children. Gall-stones which have been quiescent may be lighted up into giving symptoms under the stimulus of pregnancy.

It has been my habit when operating in the pelvis if the incision was large enough, to introduce the hand and feel the gall-bladder and frequently I have found it to be filled with calculi even when no history had been obtained of such a condition; but after the patient had sufficiently recovered, by careful questioning a history of epigastric tenderness and indigestion was brought out. Every pregnant woman should receive very careful attention as to her alimentary canal.

Is it possible to so treat a patient as to prevent infection of the biliary passages and gall-stones?

All gall-stones should be removed whether causing grave symptoms or not, for by so doing the gall-bladder is saved, thereby preventing many cases of pancreatitis. The gall-bladder should be removed if it is so hurt by the infection that it cannot perform its function, *e.g.*, that is, if it be incapable of distention and of secreting mucus.

Dr. Vaughan considered the clinical presentation of the question as very helpful. The diagnosis in many of the cases was very difficult. He thought that cholecystectomy was very desirable for on several occasions he had to repeat the operation for removal of stones. The gall-bladder surely should be removed if the cystic duct was obstructed, also in the strawberry gall-bladder, in perforation and in cancer. The greatest danger in cholecystectomy was in cutting through the common duct which could be avoided by care.

DR. ABBE had the opportunity of seeing Dr. Lane do a gall-stone operation during the summer and had been very much impressed by the fact that although the patient had given no signs or symptoms of trouble in the right iliac fossa, Dr. Lane had predicted as soon as he found the gall-stones present that there would be some interference with the emptying of the ileum near the cecum and had found a classical Lane kink. Another point which he had heard of with great interest was the finding of Dr. Lazarus Barlow that gall-stones in cancer of the gall-bladder contained a definitely larger percentage of radium than any other gall-stones. This was of special interest in connection with the reputed frequency of cancer in the radium mine regions and the frequency of cancer in *x*-ray workers.

DR. KELLEY, in closing, called attention to the fact that three-fourths of the gall-stone cases are in women and suggested pregnancy as a possible factor in the causation. The pregnancy might be simply a factor in the intestinal stasis.

Meeting of November 14, 1913.

DR. MORAN *in the Chair.*

DR. KARL CORLEY read a paper on the

FUNCTIONAL ACTIVITIES OF THE SACROILIAC JOINTS.*

DR. WILLSON congratulated Dr. Corley on the choice and treatment of his subject especially the emphasizing of the obstetrical and gynecological relations of the sacroiliac joints. In this case the physiology followed the pathology of the pain of the relaxed joint leading to the study of the physiological action and the anatomy of the joints. The obstetrical relation of these joints has long been appreciated in animals, yet it needed DeLee to call attention to the falling of the rump just before labor as due to the relaxed sacroiliac joint. Dr. Corley had pointed out how many of the needless pains of pregnancy could be avoided. One of the worst cases he had seen had been in a woman just delivered of her second child, a difficult breech presentation. On getting out of bed on the tenth day there had been severe pain not only over the sacroiliac joint but also over the symphysis pubis which could be felt as an open joint. The treatment by adhesive-plaster dressings had not been as satisfactory as by an abdominal and pelvic band. The belts were troublesome from the irritation of the perineal straps.

DR. STONE had been using this line of treatment for some time and in some instances got miraculous relief. He felt that many backaches and neuroses could be relieved by such treatment.

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* For original article see p. 595.

Dr. Lowe spoke of Goldthwaite's sign of muscle spasm which protected these joints from injury. In cases of anchylosis of these joints it was necessary at times to break up the anchylosis under anesthesia and then fix the pelvis. He thought the postoperative backache often due to this trouble. He called attention to the application of the function of the joint by putting the patient in the exaggerated lithotomy position to hasten the advance of the head.

Dr. Miller had found pelvic strapping very efficient in a certain number of obstetrical cases.

Dr. Bovèe called attention to the help to be gotten from a properly fitted corset going from the knees to the ribs.

Dr. Carr called attention to one case of atrophy of the leg associated with pain that came on in one of his patients after each childbirth.

Dr. Abbe reported one case of marked sacroiliac relaxation following the birth of a first child, in which the patient had been confined to bed for three months on account of the intense pain in the back whenever she attempted to get out of bed. She had been sent to him from the country with a request for an operation to relieve the pelvic inflammation but the symptoms cleared up immediately on the application of a snug pelvic band and the patient had left the office in comfort. He mentioned also another case of a woman of forty-four years who had passed one period and at the time the second period was due had intense pains in the region of her sacroiliac joints that were promptly relieved by adhesive straps.

Dr. Corley in closing said that the value of the adhesive strap depended on its method of application and demonstrated his method of double-fan strapping.

TRANSACTIONS OF THE OBSTETRIC SECTION OF THE FIFTH ANNUAL MEETING, AMERICAN ASSOCIATION FOR STUDY AND PREVENTION OF INFANT MORTALITY.

Boston, November 12, 1913.

Dr. Mary Sherwood, *Baltimore, Chairman of Committee on Obstetrics, presiding.*

Dr. Sherwood.—We are met to discuss one of the most important topics in the whole list of our varied life-saving subjects. The question of medical education in the United States has within the last decade received a great impulse toward betterment. We see 35 per cent. fewer schools of medicine than existed ten years ago; there are about 11,000 fewer students of medicine in the United States than were in the schools ten years ago; and we are turning out more than 2000 fewer graduates in medicine.

This might seem like retrogression, but it really means improvement; for the United States that number of years ago had an extraordinarily high percentage of physicians *per capita*. We had about one physician to 500 inhabitants, whereas in the countries of Europe the proportion was about one to 1000 or 1500.

Of the schools that have fallen out, a majority are the so-called mediocre and sectarian ones. The entrance requirements have steadily risen in the past decade. The medical student to-day has a far better average preparation than the student had ten years ago.

Various causes have contributed to this advance. Chief among them has been the rating of the schools by the Council on Medical Education of the American Medical Association. We notice that in the year of each of the three successive ratings of this Council, when the schools were divided up into classes A plus, A, B and C, the number of schools materially lessened. The report to the Carnegie Foundation for the advancement of teaching was another potent factor in this betterment. We are hoping, and we know, that this improvement will go on until our American medical schools will be upon a higher plane than formerly.

The question that concerns this body is: Is obstetrics keeping pace with other subjects in the improvement of medical training? If it is not, then it is for bodies such as this to demand that it shall.

I think I am perfectly safe in saying that obstetrics never has been placed upon the same plane as medicine and surgery. We have not considered it surgery, and yet it is surgery. Moreover we have permitted—we American people have permitted—two classes of obstetrical work to exist in our country: one class which recognizes that obstetrics is major medicine, and that the obstetrician should receive the highest training; the other which is willing to accept a much lower grade of preparation for the practice of obstetrics.

Our program to-day has been planned on the basis of the conception that obstetrics is a major subject, that it is partly surgery, and that it does require the best training, the most complete equipment, the highest ideals.

DR. W. W. CHIPMAN, Montreal, read a paper on

TEACHING OBSTETRICS.*

DR. EDW. REYNOLDS, Boston, read a paper on

THE RELATION OF GYNECOLOGICAL SURGERY TO BAD OBSTETRICS.†

DR. E. P. DAVIS, Philadelphia, read a paper on

THE NEED OF HOSPITALS FOR MATERNITY SURGICAL CASES.‡

DISCUSSION.

DR. J. WHITRIDGE WILLIAMS, Baltimore.—"I do not see how anyone in this audience can have listened to these three papers and

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*For original article, see page 398.

†For original article, see page 407.

‡For original article, see page 417.

then leave this meeting with the idea that proper obstetrics can be done by midwives. It does not seem possible that anyone could assume that an ignorant woman, after a four months' training, could be fitted to take obstetrical cases and make good along anything like the lines we have heard described. One aim of this program was to place before the intelligent women of the country the problems of obstetrics; and if after hearing these addresses you go away and advocate putting the lives of the women into the hands of midwives, it shows that you think very little of your fellow sisters.

"That is one thing. The other thing is, as Dr. Chipman told you, that facilities for teaching obstetrics in this country are lamentably poor. I have elaborated on that subject myself, and shall not repeat it here; but I will say that as far as I know at the present time there are only three lying-in hospitals in the country which are what they should be physically—I am not saying anything about the manner in which they are administered. Two are in New York City, the third in Pittsburgh and not yet opened; but with these exceptions, I do not know of others that are suitably equipped for doing the work they have to do.

"I feel very strongly about the subject. We are extremely backward in this matter, and I feel the aid must come from the women. The great advantage of these meetings is that it gives us an opportunity to put before the intelligent women of the country the deficiencies in our system of medical education. But you must remember that you have solved only a part of the problem when you have provided first-class hospital buildings; you have then to provide the money to run them, and, what is more important still, get the men and women to run them. The first great need as Dr. Chipman said is for scientific investigators to carry out obstetric investigation. We have too long been parasites upon the rest of the world, and instead of being leaders in obstetric science we are on the whole the most conspicuous learners from other nations."

DR. GEO. W. KOSMAK, New York.—"Dr. Reynolds brought up the question of perineal lacerations or 'tears,' so called, as a result of childbirth. An unfortunate idea has grown up in the minds of the laity that tears and wounds are either the essential accompaniment of labor or that they are due to the carelessness of the physician. The individual anatomical peculiarities in each case play an important part in this subject; but I think that the physician who tries to save the perineum at the risk of prolonging the labor and losing the baby is to be regarded as incompetent. A tear is certainly better in an instance of this kind than a dead baby, and I am very glad that Dr. Reynolds paid particular attention to this subject. Dr. Davis referred to the lack of proper maternity hospital care for patients of moderate means. In a rather extensive investigation of the subject in New York City, with a population of over five million inhabitants, I was surprised that all the hospitals of Greater New York afforded less than a hundred beds at prices including and below $15. The very rich and the very poor are amply cared for; the very poor certainly get better obstetrical treatment than the people of moderate means. The clerk who earns about $25 a week is unable to afford his wife the care which the ordinary street cleaner's wife can get in our modern hospital system. This situation is extremely unfortunate and our Association should draw particular attention, in their deliberations, to this matter.

The question of the practical teaching of obstetrics is a most important one. As Dr. Williams has repeatedly stated, practical education in obstetrics is in a most deplorable condition, and I think we owe to him, more than to any one else in America, the fact that the attention of the profession has been called to the situation. Unfortunately obstetrics has been regarded by most medical faculties as a sort of side issue, and I think this is more or less attributable to the fact that we allow a special class of licensed persons to practise one of the most important phases of medicine. In this connection I do not want to enlarge upon the subject of midwives, I merely want to reiterate what I have said at previous meetings, namely, that we are allowing a class of people to practise an important branch of medicine with a much too brief and unsatisfactory training. We have in this country an organized municipal school for the practical training of midwives which is situated in New York City and which is doing excellent work, but I think we should wait for the practical demonstration of what this and similar schools can do, before we advocate, in wholesale fashion, the admittance to the practice of an important branch of medicine of this class of people.

We have modelled our ideas on the subject of midwives on those of foreign countries. If we only knew how many deplorable facts are brought out in the practice of midwifery in foreign countries, I do not believe we would be so enthusiastic on this subject as we are. In my own limited travels I found the profession abroad as a whole rather dissatisfied with the practice of midwives; that they have been gradually increasing the length of the period of study from three months and six months to one year and two years in the large institutions, and not being satisfied with that they require midwives to come back at intervals for postgraduate instruction. We have not attempted anything like that and we are extending our laws to permit people to practice an important branch of medicine without a training that warrants their doing so.

DR. SHERWOOD.—Here is a very important question. Will one of the experts say whether he believes it is desirable or not to train and license midwives until physicians are able to properly attend themselves to confinements among the poor. Also does the fact that our foreigners frequently refuse to permit men to attend them, and there are not sufficient hospitals for such cases, justify midwives at the present time? Will one of our experts volunteer? Dr. Chipman says they have not that trouble in Montreal. Dr. Davis, will you answer?

DR. E. P. DAVIS, Philadelphia.—It is very interesting to hear the opinions and experiences of our friends in Boston concerning midwives. Boston is said to be not a locality but a "state of mind." Pennsylvania is a "State of mines" and this fact has an important influence on our requirements in matters of medicine. In some parts of the State we have communities of Slavs in mining regions, remote from large towns and no good hospital of easy access. These people bring their midwives with them from Europe and insist upon employing them. The authorities of the State cannot forbid these midwives to practise, but our State Board is doing everything in its power to regulate them, to examine their credentials and to correct abuses. In the cities and large towns of the State and its thickly settled portions there is no use for the midwife, and the sooner she goes the better. With good roads, motor cars and motor ambulances and hospitals throughout the State, efficient aid can be given to maternity cases without submitting to the midwife abuse.

DR. SHERWOOD.—May I add one word. Pennsylvania being a "State of mines" and therefore a rich state, it seems to me it might (as well as any other sovereign and rich state) sometime meet this problem by a state sense of responsibility to its women citizens and devise some way in which to offer to the women in any community, however remote, adequate care in confinement. We have had a hint in our proceedings yesterday, and in some of our papers during this conference, that state responsibility might reasonably be expressed in the expenditure of money for hospitals and for adequate care for women in confinement.

DR. EDWARD REYNOLDS, Boston.—Having had in the past fourteen years of experience in the service of the Boston Lying-in Hospital and Harvard Medical School, and in the slums of Boston and in the supervision of 2500 to 3000 births per year in the poorest population and among the most ignorant of our foreign population—labors conducted by students and among the worst doctors there were in Boston, and in constant touch with midwives, it has been my experience, in the first place, that the midwife is an unmitigated evil, that there is no practice among the most ignorant doctors which is so destructive to the community as that of the midwife, and I personally have seen no better results from the imported continental midwives than from the self-taught midwives of our slums. I think they are equally dirty, and, if anything, more destructive, from the fact that they have a little knowledge and are willing to take responsibilities they are not qualified for, while the untrained midwife is afraid.

As regards the statement made implying that interference is necessarily an evil, I would say that I have seen infinitely more damage to women from the absence of forceps, from unduly long labor, from that pernicious doctrine that nature is safe and not dangerous in obstetrics, than from all other causes combined. I feel free to say it since I am no longer an obstetrician.

DR. H. W. N. BENNETT, Manchester, N. H.—At no session have the points on the midwife question been driven home as they have this afternoon. I think we are in error in one particular: Some investigations have shown an alarming state of affairs in the textile cities where the doctors have been in attendance at deliveries, but it is not safe to draw the conclusion that because those things have happened the only remedy is to rush to the midwife and to training the midwife. That would be going from the "frying pan into the fire." There is no question but what the man in the country districts, in the poorer sections of our large cities, and in our textile cities, practising obstetrics to-day has not the training he needs, and which the community should demand, but he is in a far better position to bring him up to the level we want than is the midwife who has no preliminary education, is not a native of this country, and has ideas which we can never drive out. Starting with the care of the infant, I think all who have been engaged in this work have found out that the foreign mother, the foreign population, the foreign family, is much easier to reach than we were willing to concede before we started systematically to get their point of view, and their sympathy. The moment they realize that we are working for them, they are willing to cooperate.

The same thing will be true of the doctors. Many a young doctor who has come out of the medical school and gone through the hospital and given his time to maternity work in the hospital is ready to go into the fields and specialize in obstetrics, if he can get the patronage. He does not get it. The midwife organizes her work just as the labor leader does.

Another important factor that has been overlooked, is the standard of the State in its requirements for the practice of medicine. They are altogether too low, but no one in this State, or in any other State I know of, will make the necessary effort to raise the standard. Different organizations talk it over, but there is no progress; everybody simply passes the burden along to somebody else. The thing can be done. I believe one of the speakers this morning wanted to know what the General Federation of Women's Clubs could do. It seems to me that if they would tackle this midwife question they could do more good than they could in any other way.

Dr. Louis Burckhardt, Indianapolis.—It has been said that things that come from foreign countries need not be adopted immediately in this country. I would like to express it differently. You cannot put the wheels of the Swiss watch into an Elgin watch without stopping the movement. In Germany and Italy we have laws to control the work of the midwife who does the work up to the point when the immediate assistance of the physician is demanded. And it is not decided by the whim of the midwife but is absolutely laid down by law; and if that midwife neglects to call the physician in time, then she would lose her license. If a midwife has a case of puerperal fever, she is barred from the practice of her profession for four weeks, and then they control even her finger nails by making bacteriological examinations.

I will ask you if there are any particular laws in this country, and from the way the laws are administered, where we could carry out any such regulations even though we had them? It is impossible; it does not fit into the mechanism of this country.

Dr. E. P. Davis.—As regards help for the midwife situation, we have found the greatest aid in the visiting nurse, and I must pay a tribute to the visiting nurses of the Jefferson Maternity. Last year two of them made between 4000 and 5000 calls throughout the city, averaging twelve or fifteen a day—making friends wherever they go; they are welcomed, given gifts of food, sometimes carfare—making friends for science and for humanity, and they help very much in medical education, because we have a teaching maternity and the medical students visit patients in their homes; and the trained nurses teach the medical students as the presence of any good woman always teaches a man.

I have been much interested in the medical student as an attendant upon the poor, and we have yet to find any well-authenticated instance of neglect or improper treatment of the poor; on the contrary, we have people who in repeated confinements will accept the services of students and nurses and out-patient service rather than that of the careless or incompetent general practitioner of medicine.

And in the last word I say I want to ask for justice to the general practitioner of medicine. He takes obstetric practice because he has to take everything to make a living; he does the best he can, and it is not fair that the responsibilities of obstetric emergency should be thrust upon him. And those men who would be glad to send patients to the hospital frequently if there was a hospital for them, and the sentiment of the community would acquit the physician of inability or lack of enterprise in attending cases.

I am sure this meeting in its appearance and the interest displayed is a splendid demonstration of the better things and the best things that are coming to this generation.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OBSTETRICS AND GYNECOLOGY.

Stated Meeting, December 22, 1914.

The Secretary, Dr. George W. Kosmak, *in the Chair.*

REPORT OF SEVERAL CASES OF URETERAL ANOMALIES.

Dr. Henry Furniss made this report.

Case I.—This was a case of single ureter and kidney seen in the service of Dr. George Gray Ward, Jr. Overlying the pelvic brim was a mass the size and shape of a slightly enlarged kidney. Cystoscopy showed only one ureteral orifice on the left side, corresponding to the side of the mass. The trigonum was distorted in that there was no right angle. Abdominal exploration revealed the fact that there was complete absence of the uterus, tubes, and ovaries. Dr. Furniss was unable to discover any kidney on the right side, and the mass that was over the pelvic brim proved to be the left.

Case II.—This was a case of single ureter dividing and supplying the two kidneys. The patient had a large mass in the region of the left kidney, but only one ureteral opening into the bladder and that was on the right side. Dr. Braasch, in whose clinic the case was seen, passed a ureteral catheter into the ureter as far as the pelvis of the right kidney and injected collargol, continuing the injection as he withdrew the catheter. The radiograph showed the pelvis of the right kidney filled and about 5 inches from the bladder there was an offshoot toward the left kidney. The whole ureter on the left side was filled only for a few inches. Dr. Furniss said he was not conversant with the further history of this case and could not say what was found.

Case III.—This case of four ureters was discovered accidentally. Both supernumerary ureters opened ½ inch in front of the normally situated ureters, and in a line between them and the urethra. In order to determine the relation of the ureteral orifices to the distribution in the kidney both ureters on the left side were catheterized. The catheter in the ureter that emptied nearer the urethra was then injected with collargol and a radiograph made. Then both catheters were injected and a radiograph made. The radiographs showed a double pelvis and the upper pelvis corresponded to the ureter opening nearest to the urethra. This was the unusual distribution which had been found in all cases having similar anomalies.

Four Ureters.—Dr. Furniss said that thirteen cases of three ureters had come under his observation, of which nine occurred on the right side and four on the left. Only a few of them needed any special mention as they were discovered during cystoscopic examination and were not related to the troubles for which the patients sought relief.

There was a case of real hematuria from the right side, in which upon cystoscopy a dimpling was seen at the inner and proximal side of the ureter which could not be catheterized and from which indigo carmine was not excreted. This kidney was removed and had a complete double pelvis. The speaker said he was unable to tell at what point the ureters fused, but thought that it must have been near the bladder on account of the dimpling that looked like a ureteral orifice.

A second case of double pelvis was encountered while working on a cadaver in which there was a double ureteral orifice on the right side, which showed the usual distribution, *i.e.*, the ureter from the upper pole of the kidney emptied nearest the urethra.

In one case there was a stone in the ureter that supplied the lower pole of the kidney, and when first seen there was no elimination of indigo-carmine from that ureter. After removal of the stone, the function improved. This obstructed ureter as seen through the cystoscope appeared larger than its fellow on the same side, and smaller than the one on the opposite side. This had been observed in some of the other cases also.

In another instance the patient came with a history of being constantly wet since birth. Only after diligent search following the administration of indigo-carmine had he been able to discover a very minute opening just below the ureteral orifice. This opening could be catheterized for a distance of 1 inch. Cystoscopy showed two normally situated ureters functioning normally. This supernumerary ureter was implanted into the bladder through the vagina, and the patient had been thus freed from her discomfort.

In another case the patient had had the left kidney removed on account of infection. For the same reason a nephrotomy was done on the right side; only one pelvis was opened and the kidney discharged a portion of the urine through the loin and the rest through the bladder. Before operation Dr. Furniss thought he saw two ureters on the right side, but it was difficult to be certain of this.

In a recent case he had attempted to pass catheters into two ureters on the right side, but was unable to get the catheter into the ureter that was situated to the inner side of the normal one. In this case indigo-carmine was eliminated from the two right ureters at different times. Most of the cases with two ureters on the same side could be catheterized, but he considered the elimination of indigo-carmine at different times sufficient evidence of two complete pelves and ureters.

DISCUSSION.

Dr. S. W. Bandler reported five cases similar to those reported by Dr. Furniss, having two ureters on the left side and one on the right. The *x*-ray with the previous injection of collargol showed the classical arrangement spoken of by Dr. Furniss, that the catheter introduced into the lower opening went to the upper pole of the kidney and the other orifice led to the lower pole in each case. During the past month he had seen two such cases, which was rather unusual. He had had five such cases within the past three years and two of these occurred during the past month. One slide shown was taken from the patient seen within the past week and here there were two orifices on the left side and one on the right; and again there was the classical arrangement of the ureters with the lower orifice going to the upper pole of the kidney. Other pictures and pyelographs of double ureters were also shown.

The point to be noted in this demonstration was that all of these cases showed two ureteral orifices on one side of the bladder and all cases were discovered by cystoscopic examination.

Dr. D. W. Tovey said that he had had a case similar to one described by Dr. Furniss. The patient was a young woman with urinary incontinence which she had had since childhood. A cystoscopy showed two normal ureters emptying into the bladder. This patient also had a tuberculous kidney, which was removed. She was operated by the Kelly method and the incontinence still continued. After the operation the supernumerary ureter was found just behind the urethra. The patient was operated on for the correction of this anomaly, the ureter being turned into the bladder, and she had had no trouble since.

Dr. Leroy Broun said that in regard to the rarity of the occurrence of double ureters that in a report of 500 cases of extended operation for carcinoma of the uterus Wertheim had found but seven instances of double ureters. In one of these cases there were double ureters on both sides; in three there were double ureters on the left side and in three on the right side.

Dr. Furniss said that in a recent conversation he had been told that Prof. Huntington claimed to have seen only five cases of ureteral doubling in 5000 dissections. According to Huntington the most usual form was that of double pelvis and ureter, the ureters fusing before reaching the bladder. This has been encountered in the experience of a few urologists, and occasionally has been diagnosed before operation. It is a condition in which there is apt to be much confusion, especially when one pelvis is infected and the other not, as it is (often) a matter of chance as to which one a ureteral catheter would enter. One of my cases was of this type; in all others there was double ureter and double pelvis, proved in every instance either by ureteral catheters and *x*-ray, or by the different time of elimination of indigo-carmine.

HORSESHOE KIDNEY WITH THREE URETERS.

Dr. J. R. Losee reported this case and presented the specimen. This specimen was obtained from a macerated fetus which presented a congenital umbilical hernia and deformity of the left forearm. The lower poles of both kidneys have fused and the bridge between them is made up of renal tissue and not of a fibrous band which is sometimes observed in these anomalies. The lower pole of the kidney is situated at the brim of the pelvis and opposite the bifurcation of the aorta. This position is due to the fact that fusion takes place from the fifth to the seventh week of embryonic life before the kidney ascends into the abdomen. The pelves have not united and from the right side there are two ureters which run a parallel course and enter the bladder separately. On the left side there is one ureter which has a normal course throughout.

OVARIAN CYST WITH TWISTED PEDICLE.

Dr. S. W. Bandler reported this case because of its onset and duration before operation. The patient, a woman, some forty odd years of age, and a multipara, noted during the summer that her abdomen had become larger and she complained of feeling "blown up." In September she had an attack of abdominal pain which confined her to bed for three days. In October she had an attack of abdominal pain, equally severe on both sides. Her family physician suspected a kidney stone. The pains were severe, lasting on and off for a week. A consultant was called who said the patient had a kidney stone probably on the left side. After suffering for five weeks from varying degrees of pain, the patient was able to be up and about. Her abdomen felt hard and her most noticeable annoyance was constipation. Dr. Bandler said that when he first saw the patient he diagnosed her condition as an ovarian cyst, having no idea, however, of the extensive adhesions which he encountered later.

He operated on the patient a little over two weeks ago and found a large cyst reaching far above the umbilicus, intimately adherent to the anterior abdominal wall and to the lateral surfaces of the abdominal cavity. The tumor was a greenish chocolate in color. It was carefully loosened from its attachments to the anterior abdominal wall, the lateral walls of the pelvis, the great omentum, numerous coils of intestine and particularly the sigmoid flexure. There was no point of the tumor that was not attached to some intraabdominal tissue, except a certain area on its posterior surface. A trocar was introduced and the tumor reduced in size; the contents were apparently thick fluid blood, which meant the admixture of very much blood with the contents of the cyst. After extraction the tumor was seen to have originated from the left side, forming a complete twist of the pedicle which was no thicker than a thumb. After removal some time was consumed in applying hot abdominal pads to the numerous oozing surfaces and a thorough inspection of the intestines was made. The other ovary was removed and a very large Morris drain was introduced down to the left side, for the attachment of the sigmoid had been very intimate. The patient made a smooth and uninterrupted convalescence.

A CASE OF HYDATID MOLE WITH SIMULTANEOUS TUMOR OF VULVA AND VAGINA.

Dr. S. W. Bandler reported this case. He said that fortunately for the patient, but unfortunately for the scientific interest the tumor had proven not to be malignant. He had long clung to the belief that hydatid mole and chorioepithelioma were evidences of epithelial proliferation resulting from lack of a protective ferment or secretion in the body. When the laboratory report of the small associated vulvar tumor first came back that there was malignancy it seemed that this was one of those rare instances of lack of a protective element. It was found later, however, that the vulvar tumor was not malignant and neither was the vaginal infiltration.

The patient was fifty years of age, a para-xi, whose last child was born thirteen years ago, and who had menstruated regularly until three months before admission to the hospital. A period of amenorrhea had followed the last menstruation three months ago during which she had developed burning sensations in the stomach and complained of failing appetite and vomiting. Two weeks before admission to the hospital the patient began to bleed and continued to do so for several days when a sudden hemorrhage occurred lasting half an hour. Then slight bleeding followed for several days and then another profuse hemorrhage. As to diagnosis opinions varied as to whether the case was one of pregnancy or of myoma. The uterus was evenly enlarged. The upper end was the size of a child's head and seemed to be a cystic degeneration of the fundus uteri. Dr. Bandler said that because the uterus was much larger than the period of amenorrhea warranted, he made the diagnosis of pregnancy and myoma. During the four days intervening between this diagnosis and the operation, the uterus increased in size fully one-third, so that an unusual condition was recognized. An examination under anesthesia at the beginning of the curettage revealed immediately that they were dealing with a hydatid mole. After the uterus was thoroughly emptied, during which time several hypodermics of pituitary extract were given, a small pedunculated, soft tumor of the vulva on the left side was removed and sent to the laboratory for examination.

The first report which was returned said malignancy. On the fifth day after the operation there was a rise in temperature to 104° F.; on the following day the temperature was 102° F., and then it came down to 100° F. The presence of throat irritation and the involvement of the glands of the neck explained this. A few days later there was a similar rise of temperature which was explained by an involvement of the glands of the neck on the other side. The advisability of a hysterectomy was seriously considered and a vaginal examination was made to determine the size of the uterus, when a large infiltration of the left side of the vaginal wall from its middle area up to the cervix was discovered, which in view of the report on the vulvar tumor, was considered malignant in nature. However, to make sure, the patient was curetted. To ascertain the state of the uterine mucosa, a small piece was cut from the vaginal infiltration for diagnostic purposes. The report on this specimen was granulation tissue and a review of the vulvar tumor showed that in all probability it was not a malignant adenoma. Some pus was later aspirated from the vaginal infiltration, which the laboratory report stated was due to bacterium coli and possibly pneumococci. The infiltration persisted and on this account a hysterectomy for the present was not being considered.

REPORT OF CASES SHOWING THE VALUE OF PITUITARY EXTRACT IN THE FIRST STAGE OF LABOR.

Dr. S. W. Bandler said he had hoped to read a short paper on this subject, but that as he had read the paper before another society it could not become a portion of the transactions of the Section. So he had selected a few cases in which he had used pituitary extract in the first stage of labor, because after the last meeting he had participated in a discussion on the subject of "twilight sleep" and had been taken to task for advocating or practising the use of pituitary extract in the first stage of labor with the cervix dilated only one finger. The cases which he reported were private ones, which he saw and examined regularly during the entire period of gestation. He learned from these regular examinations and from the pelvic measurements with what he was dealing and knew that they were what might be called safe cases. In every one of them the head during the last weeks of gestation was firmly engaged in the pelvic brim, well molded, and in practically all of the cases very well through the pelvic brim. In other words they were cases in whom there was no doubt that a birth by natural channels was as absolutely safe and certain as any physician could wish. Only in such cases did he venture to use pituitary extract in the first stage of labor, and then he never gave more than one-half an ampoule at any one injection. He judged of the frequency with which the injection should be repeated by the progress of events, and by the duration of the pains which resulted from the injection of the pituitary extract.

There was no reason why one should not make use of the diagnostic aid which this drug gave in distinguishing between true and false pains. Ofttimes one found that the irregular discomfort and so-called pains of irregular character, were really attempts at labor, which if only a little stimulation was added of the right sort and at the right time, progressed with a saving of much time to the obstetrician and to the patient.

Case I.—This patient, three weeks before term, showed a large amount of albumin in the urine with casts, very marked and constantly increasing edema of the legs, arms and face, so that the speaker decided to induce labor. He introduced the Voorhees bag and after several hours of intermittent pains the patient became comfortable. He removed the bag and before inserting another, gave the patient one-half an ampoule of pituitary extract. She immediately went into active labor with regular pains, and by repeating the hypodermic several times, and rupturing the membranes, after fullest dilatation was gained he succeeded in delivering her in five hours.

Case II.—This patient had gone two weeks over the period of expected delivery. She lived in the country and called Dr. Bandler up on two occasions to say that she had had slight pains but that they had subsided. He had told her to let him know immediately when she began to have pains. A few days later he was again called. On arrival he was told that he had come on a false errand that the pains had ceased. Examination showed no change in the cervix but he could feel the uterus contracting somewhat after an interval. For diagnostic purposes he gave the patient one-half an ampoule of pituitrin. Within five minutes regular pains came on, and with the aid of other injections of the same drug, she was delivered in seven hours.

Case III.—This patient began to have regular pains at about six o'clock in the morning. The nurse kept him informed of the progress of the labor and when he reached the patient in the afternoon the cervix was dilated to admit one finger and the pains were coming on regularly every five minutes and sometimes oftener. The head was well molded and well through the brim and it had been in this position during the last few weeks of pregnancy. One-half an ampoule of pituitary extract was administered. Within five minutes there was a marked show and two hours later he ruptured the membranes and the woman was delivered.

Case IV.—This patient was a primipara who on the very morning which had been fixed for her confinement, reported that she had had a show but no pain. Examination showed no evidence of change in the cervix but external inspection showed contraction of the uterus. Only discomfort was reported for several hours and then one-half an ampoule of pituitary extract was given. The patient developed regular pains and was delivered in eight hours with the use of repeated hypodermics.

These cases by no means included all those for which he had used pituitary extract in the first stage. In cases in which the membranes had ruptured before the onset of labor, at the first onset of irregular attacks of pain, under the conditions mentioned the use of one-half an ampoule of pituitary extract might save hours of time by inducing a regular rhythmical labor at once.

CASE V.—This was a patient in her second pregnancy, whose first labor, not in the speaker's hands, was long drawn out and was followed for a long period after with manifestation to be classed as masked Basedow's disease. This patient was carried through her second pregnancy in spite of marked nervous annoyances and was possessed of a fear that her approaching labor would be long and tedious. She had been instructed to inform Dr. Bandler immediately at the first sign of approaching labor. At seven o'clock one evening she called him up on account of a slight show. When he arrived at her home he found her prepared to go out. He insisted on an examination, but found no change in the cervix. External inspection showed, however, contraction of the uterus. A half ampoule of pituitary extract was administered and within forty minutes her baby was born.

These cases were thus briefly reported in a manner which might show the state of mind of the physician and obstetrician when confronted with the uncertainties and delays of the first stage of labor. Dr. Bandler said that he prized pituitary extract highly in the second stage of labor in primiparæ, that it had given him most wonderful service in these cases and especially in multiparæ, might readily be imagined from the fact that he found its use frequently indicated in the first stage of labor.

DR. JOHN O. POLAK said that in the discussion which he and Dr. Bandler had had after the last meeting on "twilight sleep," he had maintained that Dr. Bandler's teaching in reference to the use of pituitrin was bad and he still maintained that it was bad. All men were not as competent to handle a drug like pituitrin as was Dr. Bandler. The practitioner who did not see so many cases of labor was not always competent to say whether the child would come through as an expert obstetrician might do and to permit this teaching to go out from the Section would be in defiance of all rules and practice. Dr. Polak said he agreed perfectly with Dr. Bandler that pituitary extract was useful when employed as he had employed it in a limited number of selected cases. He had done the same things himself, he had given one-half or one-quarter of a grain of pituitary extract if he was convinced that the head was engaged and that labor could progress satisfactorily. But, nevertheless, there were good reasons why such teaching should not go out from the Section; it was not good teaching for the general practitioner. Pituitary extract was a very potent drug and there was a difference in the strength of different preparations and a difference in the susceptibility to the drug of different patients. In his experience he had seen one-half an ampoule throw a uterus into clonic spasms, had seen one-half an ampoule shake a placenta loose, had seen a fetal heart of 140 drop to 60 and the child be born asphyxiated.

Dr. Bandler had obtained some good results with pituitary extract and was hence enthusiastic about it, but he had not gone far enough with it to see the bad results that might follow its employment. Pituitrin had one field of usefulness and that was in the second stage of labor in primiparæ and multiparæ and in multiparæ where the head was engaged and the membranes about to rupture. But when it was given the obstetrician should have chloroform and ether and forceps at hand. In primiparæ pituitrin was useful to terminate the second stage when the head was in the vagina. But here also one should be prepared with chloroform, ether and forceps. The reason he said this was that he had seen instances in which the fetal heart was about 140 and the head in the vagina and less than an ampoule of pituitary extract had caused the fetal heart to drop to 60 and the child to be born asphyxiated as the result of titanic uterine spasms. Such an occurrence as this was enough to deter one from using it. One more warning and that was that while in the third stage it might have an excellent effect in the control of hemorrhage it should never be given unless with ergot. Dr. Polak said he had seen two instances of rupture of the uterus from the use of pituitary extract, the drug having been used because of recommendations printed in medical journals. The main point in determining the advisability of using pituitary extract was whether the particular head in question could pass through the pelvic outlet, and if the general practitioner was going to use pituitrin he must avail himself of the safeguards to which he had called attention and use it only in suitable cases and not as a matter of convenience.

Dr. Bandler, in closing the discussion, said that he was very glad that Dr. Polak had stated that the teaching that pituitary extract should not be used indiscriminately should go out as the teaching of the Section. It certainly should not be used except under certain well-defined indications. The paper set down very distinct and sensible indications for the use of the drug. However, to say that the members of this Section ought not to exchange views because their ideas might be wrongly used outside by the general practitioner was not the proper stand to take nor was it any reason why he should not use the drug under discussion. In the discussion on twilight sleep it was brought out that there were certain dangers and that the method should only be used with certain safeguards and the same thing was true in reference to pituitrin; it should only be used where there were proper safeguards as he had pointed out, but that was no reason why they should not talk about it to one another. Dr. Bandler said that he followed his primigravid cases closely and knew just what to expect when they came to term; if forceps were used, at the worst they would be low or median forceps cases. If one would go slow and give the pituitary extract in small doses it would do no harm and with the membranes unruptured it was difficult to understand how small doses could do harm. If the head was well molded and through the brim, the child would pass without danger and he would rupture the membranes when complete dilatation denoted the second stage. It was to be regretted that the pituitary extract was not to be had in standardized solution. He never gave a full ampoule but only one-half or one-third of an ampoule. The pains resulting from the administration of one-half an ampoule of the pituitrin did not last long. Multiparæ were apt to have a long and tedious first stage and one might frequently give one dose of half an ampoule of pituitrin and see what happened. Frequently after giving the first dose the labor was over within half an hour to three hours. In multiparæ it was most useful as a diagnostic aid and might save the patient much pain. In one patient just last month who had had much pain and a large amount of liquor amnii, but in whom labor was not expected until this month, he gave one-half an ampoule of pituitary extract; the pains then became accentuated, and then stopped. He gave another one-half an ampoule and the pains stopped. It was evident that this patient was not in labor. After twenty-eight days she went into labor. As had been said in the paper pituitary extract was only indicated in the first stage of labor when the head was firmly engaged, well molded and partly through the brim. It shortened labor by one-half.

In discussing the question of twilight sleep he had expressed the opinion that it was not unworthy of use, but the question was asked "What had they accomplished by it?" If the pain was forgotten and shock was saved it was certainly in favor of the method. Shock, however, was less than had been indicated, and it seemed that his patients had not suffered to such a great extent, so he had not used it. The point he wished to make was that pituitrin was rendered inoccuous by the scopolamin and morphine. The twilight sleep acted as an antidote to the pituitrin and that was why he was opposed to it. The point he wished to make in his paper was that pituitrin had a place in the first stage of labor as well as in the second. It is not a drug foreign in action. It is a secretion. It added in many cases what the organism was supplying too slowly or in an imperfect form. It stimulated the uterus to effectual muscular contractions. If the uterus were stimulated at any stage to proper and normally forceful activity it accomplished only what nature did of her own accord in many cases. Hence when nature failed us, we had in our hands a preparation which would help us along normal, physiological grounds.

EXTRAPERITONEAL LIPOMA SIMULATING CYST OF THE KIDNEY.

DR. JOHN O. POLAK reported these cases. He stated that mistakes in diagnosis of intraabdominal conditions were so frequent in the practice of every abdominal surgeon, that the man who was always right became dangerous, for each error made one more careful in his interpretations of clinical findings. Of this the following case was illustrative:

This patient, aged thirty-five years, Russian, was admitted to the Jewish Hospital, November 28, 1914. The family and personal history was negative. She had had no pain before marriage, but since had complained of slight pain in the left iliac region toward the end of each menstruation. She was curetted a year ago. Her last menstrual period occurred two months prior to her admission to the hospital. She had been married twelve years, had three children, and no miscarriages. Four weeks before admission to the hospital she was suddenly seized with sharp pain in the left iliac region, which was followed by abdominal tenderness, distention, fever, and nausea. The acute abdominal symptoms continued for two weeks when she began to bleed from the vagina. The flow lasted eight days. A tentative diagnosis of ovarian cyst with a twisted pedicle complicated by peritonitis was made. Operation was refused. On admission to the hospital, the patient's temperature was 100° F., pulse 120 and of fair quality, respiration 28. The blood count showed 4,000,000 reds, hemaglobin 75 per cent., leukocytes 11,000, polymorphonuclears 85 per cent., mononuclear 14 per cent. The physical examination revealed an abdomen moderately distended, especially in its lower half, tenderness and tension being appreciable over this area; both were especially marked in the left hypogastrium and right iliac region. A firm and definitely rounded mass of smooth contour was palpated in the hypogastrium, extending from the symphysis to within 5 centimeters of the umbilicus and to the left of the median line for a distance of 10 centimeters. At operation was found an iliac lumbar tumor which was a lobulated lipoma 21 centimeters by 15 centimeters, including all the perirenal structures surrounding the lower pole of the kidney. The redundant folds of thickened peritoneum were infolded and the entire area peritonealized. A small but obtrusive appendix was also removed and the abdominal wound closed in layers. The recovery had been uneventful except that a definite extraperitoneal exudate could be palpated from the pelvic brim to the right kidney. The pathological report confirmed the clinical diagnosis.

PRIMARY SARCOMA OF THE OVARY.

Dr. Polak said that primary sarcoma of the ovary was of sufficiently rare occurrence to justify this report. The patient was nineteen years of age and single. She had been admitted to Dr. Polak's service at the Jewish Hospital, November 7. Her family and personal history were negative. Her last menstruation occurred on August 29. Just after the date of this menstruation she noticed that her abdomen seemed to be enlarging; this enlargement was rapid and progressive, at first without pain, but later with attacks of sharp pain referred to the right and left iliac regions. These attacks of pain were usually attended with vomiting but there was no disturbance of pulse or temperature.

Physical examination revealed a poorly nourished, small-framed adult, anemic, acutely ill and dyspneic. A mass was noted in the right supraclavicular region, while a firm insensitive mass the size of a small orange could be palpated in the upper and outer quadrant of the right breast (lymphosarcoma). The heart was displaced upward and to the left. The abdomen was greatly distended, dilated superficial veins coursed over it in every direction. A large firm mass was palpable in the lower central and left side of the abdomen, extending upward from the pelvis to above the umbilicus. Percussion above the umbilicus elicited tympany, with dulness below and in both flanks; a fluctuating wave was easily demonstrable. The lower extremities were edematous. Rectoabdominal examination showed the uterus carried upward and forward by an abdominal tumor the size of a child's head. A diagnosis of sarcoma of the ovary with ascites was made. An exploratory celiotomy was made on November 10, 1914, and through the peritoneal incision several gallons of serosanguinous fluid was evacuated and a tumor of the left ovary exposed. The tumor, the size of a child's head ruptured during eventration; the contained tissue was a friable brain-like structure. The hemorrhage was sharp and the right ovary, the size of a hen's egg, was also sarcomatous. Both tubes were immensely hypertrophied and edematous. Nectatores were found in the perirectal tissues, the ileum and omentum. To control hemorrhage a subtotal hysterectomy and a double salpingooöphorectomy was done and the peritoneum drained with a Mikulicz bag. The operative recovery was prompt, but as was to be expected the patient lost ground and died eight days later. The diagnosis of primary sarcoma of the ovary was confirmed by the laboratory.

Dr. S. W. Bandler said that he had been interested in intraligamentous myoma and retroperitoneal lipoma because they pointed to an embryonical tendency or weakness. The situation was such that with the colon in front of it percussion might have led to a diagnosis of a retroperitoneal tumor. This was a point where they were frequently confused and it seemed that the percussion note gave some information as to whether the tumor was in front or behind the colon.

Dr. Frank R. Oastler said that as to the diagnostic value of percussion over the colon in retroperitoneal tumors, he did not think it was of so much value as Dr. Bandler seemed to think. In such cases he had gotten no tympanitic note and yet the tumors proved to be retroperitoneal. Last June he had had a case of hydronephrosis extending over the median line and percussion gave no tympanitis over the ascending colon or cecum. Percussion was not of much value in retroperitoneal tumors.

Dr. Alfred M. Hellman said that sarcoma of the ovary was very rare. In looking over the tumors of the ovary at the "Frauen Klinik" of the Berlin Charité, of the last ten years, he found many epithelial tumors and only six fibroids and *no* sarcomas. In malignant tumors of the ovary the operation should be very radical, and that the uterus should have been removed even had the hemorrhage not compelled this step.

Dr. John O. Polak said his apology for removing the uterus was that there was a metastatic condition and also for the control of the hemorrhage. They were in a position where they had to do one of two things and they chose the lesser evil.

As to the diagnosis of intraperitoneal myoma, if one inflated the colon with air it brought out the tumor. By the use of the thermocautery bulb one could make out the tumor unless the woman was very fat, and with that help one could make a diagnosis.

Dr. Geo. W. Kosmak reported a case of

EARLY ECTOPIC PREGNANCY ASSOCIATED WITH DOUBLE OVARIAN CYSTS.

This patient was admitted to the Lying-In Hospital December 1, 1914, with the following history. Aged twenty-two, one previous child in 1912, following an instrumental delivery. The puerperium was normal. Her last regular menstruation occurred during the last week in October and nothing abnormal was noted at this time. Three weeks later, about November 20, she began to bleed and this continued up to the time of her admission to the hospital. Careful inquiries failed to elicit that the patient had skipped a menstrual period nor could any history of pain be elicited. The patient was referred to the hospital for curettage as for an incomplete abortion. On examination the uterus was found slightly enlarged and soft but the cervix was hard. No discharge of blood was noted at this time. A slight degree of tenderness was complained of when the left adnexæ were palpated and the left tube seemed to be more plainly felt than on the right side but nothing definite could be determined from this examination. A suspicion of an ectopic was nevertheless present and the patient was prepared for operation, a posterior section being decided on to clear up the matter. On the next day the examination under ether showed a distinct enlargement about the size of a small orange in the left iliac region and without curetting or attempt at further diagnosis by vaginal section, a laparotomy was done. As soon as the peritoneal cavity was entered bright red blood was encountered and a considerable number of formed clots. Further examination showed a mass involving the left ovary and tube which was brought into the wound for further examination. The ovary was decidedly enlarged and the site of an irregular lacerated wound evidently due to the rupture of a thin-walled cyst. The left tube was embedded in a mass of blood clots which extended over the posterior surface of the broad ligament and at approximately the middle of this mass a finger-like clot protruded from an opening which was believed at the time to be the site of a rupture. The tube was considerably thickened throughout its entire length and was removed together with the cystic ovary.

Examination of the right adnexa showed a cyst of the ovary as large as a goose egg which was unavoidably ruptured during delivery. This ovary was resected so as to remove the cystic portion. The right tube was normal. The abdomen was closed in three layers and the patient made an uninterrupted recovery, being discharged from the hospital at the twelfth day.

Subsequent and more careful examination of the specimen showed that we were dealing not with a tubal rupture but a tubal abortion. The finger-like clot previously referred to projected from the fimbriated extremity of the tube. Microscopical examination of sections through this clot showed a few chorionic villi. Sections of the ovary showed cysts of the Graafian follicles and a corpus luteum of pregnancy.

The particular interest in this case lies in the absence of the classical symptoms of ectopic pregnancy. There was no disturbance of menstruation present and aside from the slight bleeding nothing to call attention to the presence of an ectopic. It illustrates the necessity of careful examination in all cases of suspected uterine abortions and the advisability of doing an exploratory operation where the uterus itself does not furnish sufficient evidence of pregnancy. It is probable that in this case the abortion took place after the first examination although no force was employed and the patient did not complain. The outcome in this case must be regarded as certainly better than the natural conclusion which would have resulted in the production of an hematocele with a possible pelvic abscess later on.

Dr. S. W. Bandler said he wished to emphasize the fact that he had had many cases of ectopic pregnancy which did not go over the period more than one or two days, and some which did not go over at all. After all there seems to be no reason why menstruation should not take place at the right time, when the ectopic is in the outer end of the tube. Hence there was often no reason for suspecting such a condition if the physician had been taught to always expect a period of excessive amenorrhea as an essential symptom of ectopic pregnancy.

Dr. Frank R. Oastler said that in his series of sixty-nine ectopics there were about thirty-eight which had not skipped a period and the only symptom was irregular bleeding for a longer period, sometimes seven to ten days or even two weeks. Another interesting feature of this singular case was the double ovarian cyst with the ectopic pregnancy. The etiology of ectopic pregnancy was not definitely understood. In many cases there was no disease of the tubes or ovaries so far as one could tell, no definite pathology and in some such cases sections had been made and studied but with no results. This case was one in which there was an apparent cause, but there were many in which there was no demonstrable cause.

Dr. John O. Polak said that Dr. Kosmak had mentioned the finding of fresh blood on making the inspection; this reminded him that it had been impressed on him that in cases in which there was a suspicion of ectopic pregnancy one should not make an examination under an anesthetic. He recalled having examined a patient under an anesthetic and sending her to the ward. He was recalled on the same day and found the patient in the tragic stage. Some men seemed always to see these ectopic cases in the tragic stage, and he believed that this should not be the rule. He had written about 150 letters to prominent obstetricians throughout the United States asking questions regarding the symptoms of ectopic pregnancy and had received about eighty replies classing the chief symptom as that of metrorrhagia, and particularly if the patients had been curetted and the metrorrhagia persisted.

Dr. Kosmak, in closing the discussion, said he was convinced that tubal abortion in his case had occurred the day before the examination under anesthesia as there were considerable dark clots as well as the bright red blood.

Dr. David W. Tovey reported a case of

RUPTURE OF A PREGNANT UTERUS BICORNUS UNICOLLIS.

After describing the embryological conditions underlying these anomalies Dr. Tovey said that the case in question was referred to the Policlinic Hospital with a diagnosis of a three-month's dead fetus complicated with a fibroid. The patient was twenty-nine years of age, gave a regular menstrual history and had had several children previously. The case was diagnosed at the Hospital as a four months' pregnancy in one horn of a double uterus. A careful attempt was made to dilate the cervix and remove the uterine contents but this was found impracticable. The uterus and cervix were packed with iodoform gauze to favor the expulsion of the contents. On the next morning the patient was in good condition, and had regular pains for several hours and then suddenly the pains stopped. The gauze was removed about noon and three hours later the patient was etherized and after removing the remains of the fetus and a part of the placenta, the uterus was irrigated with strong iodine solution. This procedure was carried out by the House Surgeon. When seen by Dr. Tovey the patient was in extreme shock and in view of the possibility of a rupture of the uterus a laparotomy was done. The abdomen was opened by a Pfanennstiel incision and a double uterus found, one horn of which was enlarged by the pregnancy and presented a hole as large as a silver dollar near the septum between the cornu. A supravaginal hysterectomy was done and the abdomen closed. The patient recovered after a stormy convalescence. Examination of the specimen showed that the pregnant horn of the uterus still contained a piece of placenta; the other horn was fully developed and likewise the tubes and ovaries, the single cervical canal was dilated. It is probable that after the uterus was packed the uterine contractions resulted in the rupture.

Dr. William T. Moynan said it seemed to him that the severe shock in this case might be due to iodine entering the peritoneal cavity.

Dr. Leroy Broun said he would not use iodine under such conditions, but Dr. Bovè had advocated the use of iodine in sterilizing the uterine cavity. The latter used a 50 per cent. solution of the tincture and injected it under pressure. He had found on opening the abdomen that at times the iodine solution had passed through the open ends of the tubes. At no time had he noted any ill effects from this; of course his patients were under anesthesia.

Dr. Tovey in closing the discussion, said he did not believe iodine caused the shock. The danger was not from the iodine but when the uterus was perforated there was danger of an infection being carried into the peritoneal cavity. He had put iodine all over the lower pelvis during a Wertheim operation and there had been no bad effects.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Delayed Cesarean Sections.—Enrique Zarate (*Arch. mens. d'obst. et de gyn.*, Aug., 1914) believes that we can extend the use of Cesarean section beyond the indications for the classical section, which restricted it to noninfected cases, not yet in labor, and which had not been frequently examined and with membranes intact. There are many cases where this procedure is needed where there has been considerable delay and where many hands have examined the cases, also where the membranes have been broken and a part of the amniotic fluid has drained away. In order to extend the operation to these probably infected cases the author has devised a modification of the classical technic which has given excellent results. This technic applies scrupulously and exactly that used in abdominal operations. The woman is placed in the Trendelenburg position. The field of operation is made aseptic with tincture of iodine. There is rigorous asepsis of the hands of the operator and long rubber gloves are used. Aseptic gauze compresses 50 cm. in length are used to cover the uterus after it is exteriorized. An incision is made through this aseptic pad and the infant is extracted without removing it. For the removal of the placenta and membranes dry compresses are used. The uterine toilet is made with gauze soaked in alcohol-iodine solution, if the cervix is well open. If not, the cavity is tamponed with it. The wound and uncovered portion of the uterus are washed with the same solution. A gauze drain is placed in the uterus for forty-eight hours. Sutures are placed carefully to separate the wound from the peritoneal cavity. The author gives history of four cases operated on in this way with success.

Experiences with Hypophysis Extract.—K. A. Ebensen (*Arch. mens. d'obst. et de gyn.*, Sept., 1914) after giving a résumé of the literature of the use of pituitary body in obstetrics, concludes with the results of his personal experience with it at the "Rigshospitalet" of Copenhagen. His conclusions are summed up thus: pituitary extract initiates or increases the contractions of labor in most cases.

The contractions produced follow one another rhythmically, as in physiological labor. We should not deny the physiological character of the contractions produced by pituitary body because the pressure increases, for this is the case in the intervals of physiological labor. Abortion cannot be produced by the extract. A vague impression is produced in abortions that have already begun, but the contractions of the orifice cannot be seen. In premature labor the extract has the same effect as during labor; still the contractions have not been seen. In normal labor the extract has most effect toward the time of delivery; the effect is less sure at the beginning. Good contractions are not increased by the extract, nor do they become tetanic; it may regulate painful contractions which are tetanic and ineffectual producing regular contractions with regular intervals. High temperature seems to arrest the effect of the extract. In none of the author's cases was there any postpartum uterine atony. It was never dangerous to the child. Heart affections are not a contra-indication to hypophyseal extract, nor are albuminuria and slight nephritis. In expected convulsions the extract should not be used.

Blood Pressure during Pregnancy.—The study of the records of 450 cases by F. S. Newell (*Jour. A. M. A.*, 1915, lxiv, 393) shows that a considerable number of patients have a temporary rise in blood pressure during pregnancy without the development of other symptoms, as is found in patients under other conditions. In other cases the rise in blood pressure was followed by the appearance of albumin, a combination of which has been shown to be a definite indication of the development of toxemia. In only one case, however, did convulsions develop, the other cases yielding to treatment. Thirty-nine cases showed slight traces of albumin in the urine, but no changes in the blood pressure. As the urine was not obtained by catheter, the source of the albumin is unknown, but in the majority of the cases it was probably due to contamination of the urine by leukorrheal discharge. To judge from these cases, the presence of a slight amount of albumin, if not accompanied by a rise in blood pressure, is negligible. Eleven patients showed albumin with a high blood pressure, all of these being presumably more or less toxemic. Five patients showed a blood pressure of 140 or over throughout the period during which they were under observation. Only one of these patients developed albumin at any time during the pregnancy and all passed through labor normally, which would tend to prove that persistent high blood pressure, in the absence of other signs, is not necessarily a dangerous symptom, although it should always arouse suspicion and call for increased watchfulness, whereas, as was shown in other cases in this series, a rise in blood pressure from a low point is not infrequently followed by the appearance of albumin and the development of symptoms of toxemia, and is more significant than a high pressure throughout.

Emergencies of Extrauterine Pregnancy.—This paper of E. B. Young (*Bost. Med.* and *Surg. Jour.*, 1915, clxxii, 131) deals with sixty-two real emergencies which presented the symptoms accompanying ruptured ectopic gestation with severe hemorrhage. These sixty-two emergencies comprise thirty-one with a previous history, and symptoms typical of ectopic gestation; and yet in many of these the microscope revealed no sign of pregnancy in the tissues examined. As they presented, however, such objective symptoms as shock, tubal rupture and severe intraabdominal hemorrhage, there can be little doubt as to causation. Aside from three, dying of causes not directly connected with operation, there were eight who died of shock, and four with peritonitis—all operated upon at once. Some of these, the writer believes, would have lived had intervention been delayed, and in others, peritonitis might have been avoided by a more deliberate operation. In no rupture has death resulted where operation has been delayed, by the writer, on account of the poor condition of the patient, but several died as the result of an operation, undertaken during shock, for what was thought might be persistent hemorrhage. Judging from the series upon which this article is based, and upon others which approach the matter without bias, the effect of an operation during shock is as much to be feared as continuance of hemorrhage, and delayed operation seems well suited to some, and immediate operation unnecessary for all.

Study of the Basis of Abderhalden's Serum Reaction.—In the experimental work of W. E. Bullock (*Lancet*, 1915, clxxxviii, 223) it was found impossible to cause the production in rabbits of a ferment which digests coagulated egg white by the injection subcutaneously, intraperitoneally, or intravenously of raw egg white. A minute quantity of amino-acids is present in 10 c.c. of blood serum of rabbits and dogs, and it was found (in rabbits) that after a bleeding these substances are increased in amount. An autolytic ferment is found in the blood serum of rabbits, dogs, and in human serum. The serum of the pregnant rabbit is unable to break down rabbit placenta, and the serum of the pregnant bitch is unable to break down dog placenta. Human blood serum from the pregnant female and from the healthy male, incubated with human placenta, produced by chemical or physical action amino-acids. Rat blood serum ("normal" and "tumor") breaks down rat tumor . Guinea-pig serum ("normal and "tumor") breaks down guinea-pig tumor and mouse tumor. The blood serum of the guinea-pig was not rendered more active in this property by a previous inoculation of the animal with mouse tumor. The method devised by Abderhalden, even with the technical improvements described, is thus seen to be inadequate to distinguish normal from pregnant or cancerous sera. The fundamental experiments adduced by Abderhalden do not, on repetition, give the results stated by him, and a proteolytic ferment normally present in the serum of mammals acting on tissue substrates of varying lability, prepared in accordance with his directions, in all probability accounts for his results and their confirmation by others.

Abderhalden Reaction.—During the past year considerable doubt has been cast on the specificity of the Abderhalden reaction. As a result of experiments which he outlines, A. A. Eggstein (*Jour. A. M. A.*, 1915, lxiv, 735) concludes that specific proteolytic ferments capable of attacking only placental tissues do not exist in the serum of pregnant women. Ferments are present in the blood of such individuals, just as they are in patients suffering from pneumonia, cachexias, etc., but they are not specific for any particular human protein, and are made evident only when the antitrypsin has been partially removed. A positive reaction is due to the absorption of the antitrypsin by the placental tissue, thus permitting the ferment to act on the exposed serum protein. The serum protein, and not the placental tissue, forms the substrate from which the substances are derived which give the positive Abderhalden reaction. This is shown by the increased resistance of such treated tissue to the action of trypsin, and also by the fact that nitrogen determinations show that the tissue is still intact. The writer does not wish to intimate that the test is of no clinical value, but a negative test has more significance than a positive.

Scopolamine-narcophin Narcosis.—R. McPherson (*Ohio State Med. Jour.*, 1915, xi, 7) says that at the Lying-In Hospital, in a series of 115 cases, complete amnesia was secured in 75 cases; and partial amnesia, that is hazy recollection with distinct alleviation of suffering in 11; of the remaining 29, 25 did not respond to the drug at all, and 6 were too far advanced in labor to derive any benefit. Practically all of the successful cases were those in which the treatment was started three to seven hours before the termination of labor. The disadvantages of the scopolamin-narcophin treatment, as claimed by those opposing, are briefly two: Fetal asphyxiation and postpartum hemorrhage. It is evident that these objections are the results of an improper technic. In scopolamin cases, the tendency to hemorrhage seems to be less, rather than greater. As to the occurrence of fetal asphyxia; in the 100 cases delivered without scopolamin, there were seven instances of asphyxia at birth, two of them requiring tubs and artificial respiration for twenty minutes. The majority of the scopolamin babies cried at once, with no evidence of being under the influence of a drug; eight were moderately apneic, but responded promptly to flagellation and tubs; and two required artificial respiration for fifteen and twenty minutes. Scopolamin-narcophin treatment is of use in certain individual cases, those cases to be selected with great care, and where it is of use, it is of enormous value. Not all cases respond to the treatment, nor should the treatment be tried in every case. The indiscriminate employment will, of course, work incalculable harm, and against this danger we must all bend our energies.

In a series of thirty-five cases, J. T. Smith (*Cleve. Med. Jour.*, 1915, xiv, 43) secured perfect amnesia in seven. These were cases that received relatively large doses, and in this group occurred five complications, such as still-births, serious asphyxia, and a need for forceps. No cases were free from pain during uterine contractions. Fourteen or fifteen cases showed no loss of memory at all. The remaining patients, when questioned, some days after delivery, had "islands" of memory scattered through the period of labor.

Treatment of the Second Degree of Pelvic Contraction.—H. Jellett (*Surg. Gyn.* and *Obst.*, 1915, xx, 158) states that in the second degree of pelvic contraction, the true conjugate measures between 2¾ and 3¼ inches in a flat pelvis, or between 3 and 3½ inches in a generally contracted pelvis. Pubiotomy is the operation of choice, unless there are special circumstances in the case or special complications present. Pubiotomy is especially indicated in the young multipara, because of the effect of the operation on subsequent pregnancies, and because, owing to previous labor, the vaginal canal is dilated and lacerations are unlikely to occur. On the other hand, Cesarean section is more suitable in the elderly primipara, because vaginal laceration is more likely to occur, and because it is unnecessary in her to take account of future pregnancies. Premature labor is indicated only under special conditions which render either of the foregoing operations impossible or inadmissible. Craniotomy is permissible only when the child is dead.

Pneumococcic Peritonitis of Extragenital Origin in a Puerpera.—Erwin Wetzel (*Münch. med. Woch.*, Feb. 2, 1915) describes a case of puerperal pneumococcic peritonitis, which arose as a result of an extragenital pneumococcus infection. Infection of the peritoneum not infrequently occurs during labor or the puerperium the organisms entering either by the lymphatics, of the uterus or its bloodvessels, or those of the parametrium. The lumen of the tube may be the port of entry for the bacteria. The pus is thin and yellow, and the infection occurs from the first to the third day after labor. Generally the cause is the streptococcus, seldom the Klebs-Löffler bacillus, or the various causative germs of pneumonia. Secondary pneumonic peritonitis is not generally diffuse, but consists of localized pockets of infection walled off from the general cavity. Often it is confined to the genitals and never reaches the peritoneum. There may be at the same time a pneumonia of the lungs. In the author's case labor was normal. Death occurred from peritonitis with a uterus normal in substance. The pus gave a pure culture of the diplococcus pneumoniæ. The lungs and pleura also showed pneumococcic infection. The child also died of pneumonia. The pneumonia was the primary lesion, the peritonitis secondary. The latter began in the upper abdomen, probably carried by the lymph stream from the pleura, but it may have been a blood infection of the peritoneum from the pulmonary lesion. In the child it was an intrauterine infection from the endometrium.

GYNECOLOGY AND ABDOMINAL SURGERY.

Antigonococcic Serotherapy and Vaccinotherapy.—Eug. Gajoux (*Arch. mens. d'obst. et de gyn.*, Aug., 1914) reviews the work that has been done in reference to the use of vaccines and sera in the treatment of gonorrhea in gynecology and obstetrics. One of the difficulties in estimating the value of such treatment is that we are often unable to find the gonococcus in chronic cases of metritis, salpingitis, etc., while clinical manifestations make us sure that this is the true origin of the trouble. Also in women frequently the disease takes on an insidious form, with few manifestations beyond an increase of discharge, which is considered natural. To meet these conditions serotherapy was attempted. To make an effective serum two conditions must be satisfied: (1) we must obtain pure cultures of the germ; (2) we must obtain by inoculation an experimental gonorrhea in a laboratory animal which may be immunized by an antigonococcic serum. Neither of these conditions can be fulfilled. Antigonococcic sera do not appear to have a true specific action. This method of treatment being unsatisfactory, it has been attempted to treat gonorrhea by vaccines of various kinds. These may be stock or autogenous vaccines. The mode of application is by a simple hypodermic injection into the subcutaneous cellular tissue under aseptic precautions. Wright considered that we might make a diagnosis of gonorrhea by injections of vaccines, by the local and genital reactions obtained. The general reaction occurs within five to six hours after the vaccine is applied. Certain authors use an intradermal reaction for the same purpose. This reaction will not occur in tuberculous or streptococcic annexitis. But neither vaginitis, nor urethritis reacts in this way, and they are not influenced by the use of vaccines. Although some favorable results have been obtained by this form of treatment it has on the whole been unsatisfactory. On the other hand, we get excellent results in the vulvovaginitis of little girls, in whom the tissues are more fragile and the reaction very violent. Here the germs are more accessible to the vaccines because they are confined in a closed cavity, so to speak. In gonorrheal annexitis especially good results have been obtained by the use of vaccines. Finally the author gives these conclusions: Antigonorrheal vaccines have not fulfilled their promise; they have no prophylactic action, and their curative action in obstetrical and gynecological gonorrhea is seen only in certain of their complications. New researches may give better results.

Fibroma of the Broad Ligament.—M. Haller (*Arch. mens. d'obst. et de gyn.*, Oct., 1914) apropos of two cases of intraligamentous fibroma observed by himself, gives us a study of the subject. He says that an intraligamentous fibroma may have no connection with the neighboring organs. It will then be either an interstitial fibroma of the broad ligament or a polypus of the ligament. It may have as its point of departure the uterus, in which case it may be sessile or pedunculated. Finally intraligamentous fibromata may arise from the tubes, ovaries, and uterine and tuboovarian ligaments. A study of the relations of such tumors with the neighboring organs show two kinds of tumors: those which arise from other organs and by their growth pass between the folds of the broad ligament, and those which are free in the broad ligament without connection with any other organ. As to the origin of the last-named variety, some have held that such tumors have always at the beginning been of uterine origin; that they are migrating uterine fibromata, which become detached and remain free between the folds of the ligament. Among others Klebs, Virchow, and Kiwisch espouse this opinion. Sanger first believed that these tumors had a local origin, arising from the muscular fibers in the broad ligament. Also the débris of the Wolffian bodies accessory suprarenals, and accessory tubes may have been their source of origin. Gross, Nancy, and Lang have defended this view. To-day the generally accepted opinion is that there are two kinds of intraligamentous fibroids, those arising from the ligament itself, and those springing from the uterus, ovaries, tubes, round and other ligaments.

Hemorrhage into the Ovary Associated with Severe Dysmenorrhea.—The interest in a case reported by B. Whitehouse (*Jour. Obst. and Gyn. Brit. Emp.*, 1914, xxvi, 152) lies in the unusual appearance presented by the ovaries on section, and in the clinical association of the lesion with extreme dysmenorrhea. When hemorrhage occurs in the stroma it usually forms a considerable extravasation with wide destruction of the normal elements. In the available records it has generally been associated with ovarian gestation or inflammation of the uterine appendages. In the latter case it has been called "ovarian hematoma." In the large majority of cases hemorrhage is not confined to the stroma, but occurs also in greater or less amount in the follicles. The present specimen differs from others in that the hemorrhage is of a punctiform or petechial nature, is unassociated with bleeding into the Graafian follicles and unconnected with inflammatory changes either in ovary, tube or uterus. The cause is obscure. It cannot be due to secondary rupture into the stroma from Graafian follicles, as has been suggested in some cases of diffuse hemorrhage. There is no evidence in the history of any toxic agent at work, and furthermore the lesion is limited entirely to the ovaries. The absence of any inflammatory changes precludes the definition "hemorrhagic oöphoritis," and the only term which appears adequately to meet the case is "ovarian purpura." The clinical association of the lesion with acute menstrual pain appears to be clear. The failure of curettage and dilatation of the cervix to relieve the pain and the absence of any evidence of disease in the uterus after removal, suggests that the seat of the dysmenorrhea lies in the ovaries. Discomfort was present from the commencement of the function. It is possible therefore that the cause of hemorrhage lies in a local developmental defect in the capillaries of the cortex, by which they are unable to resist the congestion normally taking place at each menstrual period. In cases of severe intractable dysmenorrhea unrelieved by drugs and therapeutic measures applied to the uterus, exploration of the ovaries appears to be justifiable and indicated.

Intestinal Fistulæ to Facilitate Recovery from Conditions Following Abdominal Operations.—J. D. Malcolm (*Proc. Roy. Soc. Med.*, 1914, viii, *Obst. and Gyn. Sect.*, 15) says that after an operation involving the peritoneal cavity conditions sometimes arise in which the surgeon believes that if he can induce the bowels to act the patient will recover, but that if the bowels will not act the patient will die, and yet an autopsy in such a case may show no obvious cause of obstruction. The symptoms are usually attributed to a paralysis or paresis of the intestine, and it is commonly said that the ineffective peristaltic action is caused by a septic infection of the peritoneum. The evidence seems conclusive that in some of these cases the symptoms are due to an increased resistance to the passage of the intestinal contents associated with an enfeebled peristaltic action which is not due to a septic peritonitis. The condition may be described as one of acute intestinal stasis. Occasionally a cure may be affected by making a fistula, this treatment being founded upon the belief that in some cases a delayed action of the lower bowel and not a septic peritonitis is the cause of intestinal distension. In five of the six cases in which recovery took place the fistula was successfully closed. The success of a fistula formation depends mainly upon a selection of cases in which the symptoms are not due to a septic contamination. If the surgeon is confident that his efforts to prevent peritoneal infection have been successful, and especially if he knows that raw surfaces have been exposed uncovered by peritoneum in the abdominal cavity, the possibility that distension may be caused by adhesions to the bowel and that the patient may be saved by making a fistula should not be forgotten. To be successful this treatment must be undertaken before the diffuse peritonitis which precedes death in these cases begins, or at least before it has spread far. But the surgeon has to decide first that the ordinary nonsurgical forms of treatment are useless. If he can do this on or before the third day, if his patient is then in good condition, and if the circumstances of the first operation offer a hope of success, the surgeon may then be justified in attempting to define and treat the cause of the symptoms. After the third day, if no gas has escaped from the anus, and if operative treatment is considered necessary, especially if it is known that many raw surfaces have been left uncovered by peritoneum, the surgeon should, as a rule, resist the temptation to define the conditions present, and should content himself with exposing a distended coil of small intestine as low in its course as possible, or the cecum, and opening it quickly, doing nothing more unless it be to drain the peritoneal sac also. If gases pass the anus after the operation but not freely, surgical interference may be delayed, and the bowels may gradually recover their tone. If the patient gains strength, and the partial obstruction continues, a more extensive operation may be undertaken later, but prolonged distension with vomiting may make the patient so weak that again only the smallest interference possible can be borne and any surgical treatment may be dangerous.

Phenolsulphonephthalein Test from the Viewpoint of the Abdominal Surgeon.—S. F. Tracy (*Surg. Gyn. and Obst.*, 1914, xix, 734) reports his results in 100 cases. The dye appeared in the urine from five minutes to forty-two minutes, the average being ten minutes and eighteen seconds. The average output for the first hour was 34.27 per cent., for the second hour 20.83 per cent., and for the two hours 55.1 per cent. In 91.7 per cent. of the tests the output was greater in the first hour. In 8.3 per cent. of the tests the output was greater in the second hour. In 20 per cent. of the tests there was 4 per cent. or less than 4 per cent. difference between the output in the first and second hours. Five cases, with the lowest phthalein output in the series, were subjected to major operations and had a normal convalescence. Other cases with a much higher phthalein output had a complicated convalescence, with evidence of renal disturbances. One case, with a phthalein output of 53 per cent., died of uremia in less than two months. Another, with a phthalein output of 72 per cent., died of uremia in less than one month. One, with a phthalein output of 55.5 per cent., died in the hospital of uremia fifty-two days after operation. A fourth, with a phthalein output of 87.5 per cent., died in the hospital of uremia five days after operation. In some cases the phthalein output was less after the patients were placed in bed and the excretory organs toned up; in other cases the output increased. In determining the functional activity of each kidney the test should be applied several times and the average taken. The result should then be checked up by other tests. It does not seem possible to work out the minimum percentage phthalein output which will be safe to undertake surgical operations, nor is it possible from the phthalein test to determine what cases should or should not be subjected to operation. In determining whether or not a patient should be subjected to operation, the history, clinical symptoms, and physical examination are of much greater value than any renal functional test yet devised. The phthalein test used in conjunction with the clinical symptoms, history, and physical examination is of value. A small percentage output should put the surgeon on his guard and cause him to study the patient most carefully before undertaking an operation. The phthalein test should be used only as one of the many methods of investigation in ascertaining the condition of the patient.

Treatment of Fibromyomata Uteri by Radiotherapy or Surgery.—S. E. Tracy (*Penn. Med. Jour.*, 1915, xviii, 353) says that Röntgenotherapy should be limited to the treatment of these tumors as follows: (*a*) In a patient whose general health is so much below par, from any cause, that she could not withstand the shock of an operation; (*b*) in cases of marked anemia to temporarily control bleeding until the patient is sufficiently restored to health to undergo an operation, and (*c*) in a patient who continues to bleed after a myomectomy, and an histological examination of the tumor and endometrium shows no evidence of a malignancy. When we consider that over 33 per cent. of patients with fibromyomata uteri could not be cured by Röntgenotherapy, that over 25 per cent. would sooner or later perish under such treatment, that the tumor can be removed by skilled surgeons with a mortality of less than 3 per cent., it would seem that the only rational treatment for these tumors, which produce symptoms, with the few exceptions given, is early surgical intervention.

Heliotherapy in Abdominal Tuberculosis, Pulmonary Tuberculosis, and Nontuberculous Affections.—Georges Vitoux (*Bull. gén. de thér.*, Jan., 1915) says that in the treatment of tuberculosis of the peritoneum marine heliotherapy hold first rank. It is the sole means of obtaining a cure in patients formerly considered doomed. The best results are obtained in the chronic forms. It is indicated in all ascitic peritonitis, in the ulcerocaseous form, the fibrous form with retracted epiploon, when secondary to tuberculosis of the intestine, in anasarca, and in localized tuberculous peritonitis, such as pelviperitonitis, perisplenitis, and perihepatitis. The patient should begin treatment in the chronic stage by a week of sojourn in the climate without sun-baths, then should take them gradually increased in length. Diminution of the pain will begin at once, and temperature will be lowered and appetite improved. In ascitic forms the fluid should be drawn off. The fibrous forms require longer treatment. Enteroperitoneal cases are well affected. Tuberculous nephritis has received benefit. In tuberculous cystitis the pain is at once relieved and the vesical capacity increased. In genital tuberculosis in women dysmenorrhea is improved, and amenorrhea ceases. On pulmonary tuberculosis the sun's effect is marked in improving the general condition, causing destruction of bacilli and sclerosis to take place. It increases repair greatly. Heliotherapy excites all the functions of nutrition, and improves the general condition. It disinfects the organism, arrests or attenuates the virulence of bacilli. It hastens closure of torpid wounds, varicose ulcers, buboes, burns and inflammations. It acts well on complicated fractures, osseous grafts, periostitis, osteomyelitis, and muscular atrophies.

Use of Citric Salts in Congestive Dysmenorrhea.—B. L. Spitzig (*Jour. A. M. A.*, 1915, lxiv, 733) says that most nonorganic types of painful menstruation, frequently complicated by sterility, may be ascribed to the one essential, congestion. In a previous paper he suggested that increased viscosity of the blood takes part in the production of dysmenorrhea, the causative factor being faulty hygiene, defective elimination, nitrogenous overindulgence, sedentary occupation and tight lacing. According to his theory, at the time of uterine congestion, the blood in this organ is more viscid, and with the accompanying stasis there is greater infiltration of serum into the neighboring tissues. This induces a change in the chemical equilibrium of the endometrial cells by causing the cellular colloids to absorb more serum and transforming this gelatinous material into a viscid mass. The effects are greater distention of the spongy layer and increased vascular stasis and mucus production, with the consequent shedding of fibrinous and thrombotic membranes. With this morbid state the ovum cannot readily engraft itself, and sterility is a frequent sequel. Reducing the viscid blood inhibits the formation of clots and membranes; stasis is diminished and excessive edema of the endometrium retarded. Bleeding through the glands is increased, and diapedesis through stroma and epithelium lessened.

In regard to treatment, nitrogenous food raises the viscosity of the blood, and accordingly is restricted before the menses. Catharsis depletes the portal circulation, and at times a hot compress is applied for the purpose of relaxation. The important procedure is the reduction of viscosity through the use of sodium citrate, 20 grains three times daily, during the week or two preceding the expected period. The mode of action is peculiar to the citrates. Diuresis does not explain the results. It seems probable that the alkaline citrate neutralizes carbonic acid and other waste products and increases oxidation, thus proving to be the most efficient method for preventing cellular edema and diminishing viscosity.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATION.

OVERFEEDING IN INFANCY AND ITS PREVENTION.*

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When I chose this subject for a paper to present this evening I hardly expected to give anything original, but hoped to point out some old facts and perhaps by reviewing some of my personal cases to give you some food for thought. I have long been interested in infant feeding and almost daily find some infant that is overfed. Dennett says, that overfeeding is the most frequent kind of improper feeding, and that it is as fascinating as a game to watch the weight of a baby go up each week, but we must be careful lest we increase the strength of the food too fast.

Overfeeding very frequently is a cause of diarrhea.

You are undoubtedly familiar with Finckelstein's classification of nutritional disturbances. First, balance disturbance, in which an infant's assimilation is disturbed so that although it is getting sufficient food (100 calories per kilo) and has no diarrhea or vomiting it does not gain in weight. He thinks the overfeeding of fat the most frequent cause. This may result in a dyspepsia if the food is increased in our effort to increase the weight, or it may be carried to the point of an intestinal intoxication (diarrhea).

I could quote many good authorities showing overfeeding to be a common cause of gastrointestinal disturbances.

Brady says that summer diarrhea is now explained as due to overstepping the tolerance limit which has been lowered by excessive heat. This is undoubtedly true and I have always been careful not to overfeed during hot weather, much preferring to slightly underfeed, being contented to have a well infant even if its weight is temporarily stationary. I also reduce the sugar or stop it entirely during these

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*Read at the January meeting of the University Research Club.

hot periods, knowing it to be a common causative factor in producing diarrhea.

You may ask, how are we to know when we are overfeeding? First let me say a word against the common practice of feeding an infant by its age by set formulas. This is not always reasonable as the following cases show.

In September, 1913, I had two infants in adjoining cribs, ages eight weeks and fifteen weeks respectively, weighing 7¾ and 8¼ pounds. They were taking the same formula and both were gaining in weight. These infants certainly could not be fed by age. Instances similar to these are not uncommon.

I am frequently asked for my formula for an infant of a given age. My answer to this is that I have no formula and that the food for the infant would depend upon its weight, condition of stools, symptoms and previous feeding history. There are different factors to be considered in determining the proper amount of food a given infant requires, some writers laying much stress on the estimation of calories in the food.

It has been estimated that a normal infant during the first few months requires about 100 calories of food to the kilo weight (45 calories to the pound) in twenty-four hours.

Howland criticises this method, as the energy quotient of 100 calories was first determined on the basis of calorimetric observations made on infants at rest, and he has shown that the heat elimination of infants crying or making active motions is 18 to 39 per cent. greater than when at rest.

Grulee says everyone will readily recognize that the infant organism requires more than simple fuel, and that this method must be regarded as a check upon the amount of food rather than any definite effort to regulate nutrition. We all know that a marasmic infant requires more calories to kilo weight than the normal infant.

Other writers base their food estimation on different, and I think more scientific, principles, adapting the food elements to a given case, taking into consideration the weight, stools, and previous feeding history.

One frequently sees an infant's food increased because it is not gaining in weight without the condition of the stools being considered. It certainly is poor judgment to try to get a weight gain by food increase if the food then taken is not being properly digested.

To me the most important key to a feeding case is the stool, in fact I have often said that I would much prefer to see the stool than the infant if both could not be seen. Mothers bringing feeding cases to my office are always instructed to bring a stool at each visit.

Hoag says that it is not rare to find infants getting 6 to 7 per cent. fat mixtures or 7 to 9 per cent. sugar, that they may show a phenomenal growth, but as we are violating all precedents established by nature trouble is almost sure to follow.

Allen has conclusively shown that in twenty-four hours it requires the protein in 1 ounce of milk per pound weight to maintain (theoretically) a nitrogen balance, and for the infant to build up sufficient nitrogen in its tissues the protein of 1½ ounces milk per pound weight is needed.

Grulee well classifies the signs of overfeeding as follows: First, Rapid increase in weight followed by loss or stationary weight; second, large bulky stools; third, polyuria; forth, sweating, especially about the head; fifth, rapid respiration.

To this I would add skin eruptions as eczema and boils. At the present moment while writing this paper I have been consulted in regard to an infant one month of age who is getting a 4½ per cent. fat mixture.

I advise my students to reckon the percentages in the food, examine the stools, watch the weight chart, and to reckon the caloric value of the food per pound weight, which may easily be done, and these points will often help to avoid overfeeding, either of any one element, or too much of a well-balanced formula.

One only too frequently sees an infant have its food increased because it cries, the stools not being considered. These infants may already be getting too much food, a reduction of which is followed by a gain in weight (Finckelstein's paradoxic reaction).

The following case will illustrate this point.

CASE I.—Male, four months, weight 9 pounds, breast fed three months then on a proprietary food a short time. When seen it was taking top milk 12 ounces, water 15 ounces, lime water 4 ounces, milk sugar two teaspoonsful. There had been no weight gain during the past month, stools curdy, some vomiting, the infant was pale and the muscles flabby, with eczema on face, neck and shoulders; there was also much colic and frequent crying.

It was given barley water for twenty-four hours (during which time the infant was perfectly contented) then the following formula: Skim milk (4 ounces having been taken off the quart) 10 ounces, barley water 18 ounces, seven feedings, 4 ounces each at three-hour intervals. The stools became natural and pasty, the colic disappeared and the weight increased 6 ounces the first week, and at that time the skin condition was much improved. At the end of the second week the milk had been increased to 14 ounces with another gain of 5 ounces.

Case II.—Male, eight months of age, marasmic, weight 10¼ pounds. In an effort to get a more rapid weight gain the food had been increased gradually, and on May 26, he was getting whole milk 40 ounces, water 10 ounces, sugar 1 ounce, five feedings of 8 ounces (88 calories per pound, June 3, weight 11¼ pounds; June 10, weight 12 pounds; June 17, weight 12 pounds, 11 ounces; June 24, weight 12 pounds, 8 ounces; at this time the stools became bad and the weight decreased. I first saw this infant at this time and started it on skimmed milk and barley gruel, gradually increasing the amount of milk and taking off less cream. On August 4, this infant was getting whole milk 25 ounces, barley gruel 22 ounces (42 calories per pound, and was making a satisfactory gain in weight.

Case III.—Female, artificially fed from birth, the weight gain had been very slow and at seven months this infant weighed 10 pounds and was marasmic, the food at that time as reported was whole milk 26 ounces, water 12 ounces, sugar 1⅓ ounces (May 13, weight, 10 pounds, 3 ounces; milk 28 ounces, water 10 ounces, sugar 1⅓ ounces) (June 15, weight 12 pounds, 6 ounces; milk 38 ounces, water 10 ounces, sugar 1⅓ ounces, 75 calories per pound). June 23, weight, 12 pounds, 14 ounces, stools loose with curds, weight decreasing. Seen at this time and treated as Case II and at eleven months was getting 30 ounces whole milk with cereal, weighs 15 pounds, 10 ounces (45 calories per pound), and is making a good gain.

Case IV.—Male, birth weight 7½ pounds, breast fed, five and one-half months. At five and one-half months he weighed 16 pounds. At this time he was weaned and a top-milk mixture with a proprietary food prescribed. I first saw this infant at seven and one-half months of age, its weight was 14¾ pounds, the muscles were flabby, there was a slight rosary with some flaring of the ribs, there was marked constipation with typical soap stools, the infant did not sit alone as it had previously done. An analysis of the food as being prepared by the mother was as follows: fat 5.44 per cent., carbohydrates 4.44 per cent., proteid 1.05 per cent.

Case V.—Male, four months, birth weight 8 pounds, weight at this time 11 pounds, breast fed for three months and did well, at this time it was weaned and given a top-milk mixture which was increased as the infant seemed to demand. When seen it was taking, fat 4.5 per cent., carbohydrate 6.8 per cent., proteid 1.3 per cent. (79 calories per pound).

No comment is necessary on this formula.

At this time the stools were green with many fat curds, there was colic and a moderate eczema about the face, the weight was stationary. This infant was given skim milk 18 ounces, water 18 ounces, boiled three minutes. The boiling was soon discontinued and the fat gradually increased. At the end of the second week the stools were good, the infant contented and the weight 11 pounds, 6 ounces.

Overfeeding is by no means infrequent in the breast-fed infant. One frequently sees a breast-fed baby overfat, with varying degrees of eczema as a result of too frequent nursing, the infant stripping the breast thus getting a high fat.

The method of handling these cases is evident.

It is well known that the first milk the infant obtains from the breast is much poorer in fat than that obtained last, and that frequent nursing gives the infant a food richer in fat.

CASE VI is illustrative.—Female four months, birth weight 7½ pounds, weight now 13 pounds, breast fed; has vomited considerable since birth, this has gradually increased and at this time when the infant came under my care it was vomiting a large portion of each nursing. It was nursed every two to two and one-half hours; the breast milk had been examined and said to be poor. An analysis of a sample taken before nursing showed, fat 3.6 per cent., one taken after nursing 8.64 per cent.

Nursings limited to five minutes and preceded by hot water at three-hour intervals were advised and as a result all vomiting soon stopped, the infant began gaining in weight and the breast secretion was much increased.

My record files would show many cases similar to the ones cited. The overfeeding and the handling of breast-fed babies is a very large field and worthy of more consideration than it receives. It has been generally shown that about 85 per cent. of infants dying from gastrointestinal trouble have been bottle fed. Overfeeding is by no means limited to the first year, and I believe much of the bowel disturbance during the dreaded second summer to be due to overfeeding.

75 GRANT STREET.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS.

Meeting of January 14, 1915.

WALTER LESTER CARR, M. D., *in the Chair.*

FOUR CASES OF HEMORRHAGIC DISEASE IN THE NEW-BORN TREATED BY HORSE SERUM.

DR. A. HYMANSON stated that various hemorrhages were responsible for a great part of the high death rate among the newly born. Infection, syphilis, hemophilia and mechanical causes attendant upon labor played an important rôle in the etiology of hemorrhagic diseases. It seemed that nothing definite was as yet known about melena neonatorum, but the rapidity of the hemorrhage and the resulting collapse, compelled prompt action. The treatment was directed to checking the bleeding, maintaining the strength of the child by replacing lost fluid, to promoting coagulation of the blood and counteracting sepsis. The drugs that had been used were adrenalin, calcium, and gelatine, the latter on account of the calcium it contained, but blood therapy was the agency most generally used in the endeavor to control these hemorrhages.

Although they had had favorable reports from abroad concerning the use of calcium and particularly gelatine, still it was well known that there was no lack of calcium in melena neonatorum. Remarkable cures had of late been obtained in all hemorrhagic conditions by direct blood transfusion, subcutaneous injection of human blood, human blood serum, horse and rabbit serum. Rabbit serum was used because it was easily obtained fresh.

Blood transfusion was quite a difficult operation as the infant's blood-vessels were so small. It was also frequently difficult to get a donor; the mother was too weak to undergo the operation and could not spare the blood; the father might be an ideal donor, but was not always at hand and not always willing to give the blood. It was not so easy to obtain a healthy stranger at the moment, one whose blood would not cause hemolysis. The expense was also an item.

Subcutaneous injection of human blood or blood serum was administered more easily, but it was difficult to obtain, as 40 to 50 c.c. of serum required about 120 to 150 c.c. of blood, although in maternity hospitals, blood or blood serum could be obtained from the placenta.

Fresh animal serum, just as human serum, contained all the ferments of the blood and acted by its nutritive and bactericidal power; it also hastened coagulation. Hence it had been found very useful in hemorrhages of the newly born. The author had used horse serum in four cases of melena neonatorum, three of which recovered, while the fourth died.

CASE I.—This patient was a male child, eight days old, whose family history was negative. The mother's urine contained traces of albumin and her blood showed a marked polycythemia. The coagulation time was seven and one-half minutes. The Wassermann reaction was negative. The child was apparently well until the fifth day when bleeding began from the navel and occasional purpuric spots appeared on the lower extremities. The bleeding continued on the sixth and seventh days. Calcium lactate was administered without any improvement. On the eighth day the infant vomited a great deal of blood and had several profuse hemorrhages from the nose, mouth and bowels; there were also subcutaneous hemorrhages, some the size of a quarter of a dollar, on both sides of the thorax, and on the back and lower extremities. By evening of this day the baby was in a moribund condition, with a temperature of 97.5° F. and a pulse that could not be counted. The coagulation time of the infant's blood was eleven minutes. Twelve cubic centimeters of normal horse serum was injected subcutaneously. By the following morning there was some improvement, but the bleeding from the rectum continued. A second injection of 12 c.c. of horse serum was then administered and in the evening another injection of 14 c.c., making in all 38 c.c. On the tenth day the bleeding stopped entirely and the child's temperature became normal. He gradually returned to perfect health which he had retained ever since.

CASE II.—This baby was a female child, born on September 10, 1914, of healthy parents, at full term. The labor was normal. Profuse bleeding from the mouth and rectum began on the second day. The coagulation time of the blood was about twelve minutes. The child's temperature was 97.6° F. Fifteen cubic centimeters normal horse serum was injected subcutaneously. On the third day the bleeding from the rectum still continued and the baby looked very weak. Another injection of 12 c.c. of horse serum was administered and within eight hours the bleeding stopped completely. On the following day the stools were normal. The baby rallied slowly and was discharged on the thirteenth day in a normal condition.

CASE III.—This patient was a female child, the second; born at full term. The labor was troublesome on account of placenta previa marginalis. The family history was negative.

On the fourth day the baby had about five hemorrhages from the rectum and vomited a small amount of blood. She was given 15 c.c. of normal horse serum. On the fifth day the bleeding from the rectum still continued, but not so severely. Another dose of horse serum (15 c.c.) was injected and the bleeding stopped completely. This child was also discharged in good health on the thirteenth day.

CASE IV.—This patient was a male child, with a negative family history. Labor had been protracted and the baby was born asphyxiated. He did well until the fourth day when his temperature rose to 101.5° F., and later in the day he passed much blood from his bowels and vomited blood. Two grains of calcium lactate were given every two hours without effect. An injection of 12 c.c. of horse serum was then administered. The bleeding, however, continued and by the following morning the child was in a precarious condition. An injection of 12 c.c. of the mother's blood was then injected into the infant's back. The infant did not respond to the treatment and died that evening.

These cases all occurred in the Jewish Maternity Hospital. The horse serum was furnished by the Department of Health.

In closing, the author said he wished to add a word about anaphylaxis. The use of horse serum as a medium for the various antitoxins had shown conclusively that the dangers of serum sickness and death had been greatly exaggerated. Serum sickness, as a rule, was a very mild affection, lasting only a few days. Serum death was a rare occurrence. Dr. Probasco (*N. Y. State Jour. of Med.*, Jan., 1912) claimed that there was only one death in 25,000 injections of diphtheria antitoxin. In some cases in which death was supposed to be due to antitoxin autopsy had revealed a status lymphaticus before unsuspected. It had further been shown that nearly all deaths from antitoxin occurred in patients during adolescence or in asthmatic adults.

The author concluded that: 1. The coagulation time of the blood was somewhat delayed in the conditions under consideration. 2. As there was always a difficulty in obtaining human blood or fresh blood serum, fresh horse or rabbit serum would serve the purpose almost as well. 3. In the newly born infant, the horse serum should be administered early and repeatedly until the bleeding ceased. 4. The injurious effect that was caused by foreign serum had been greatly exaggerated.

DISCUSSION ON DR. HYMANSON'S PAPER.

Dr. Henry Dwight Chapin said that in two cases of hemorrhage in the new-born that had come under his observation the horse serum had been tried but had not been effective and they had been compelled to fall back on human blood serum.

Dr. Chapin asked Dr. Hymanson if he had considered giving diphtheria antitoxin as a means of administering the horse serum, and if he had used the human blood serum; and, if so, with what success.

Dr. L. E. La Fêtra said it was well known that the use of blood serum would check most hemorrhages of the class under discussion, but the use of whole blood as proposed by Schloss is much simpler. By Dr. Lindeman's method it was a very easy matter to withdraw 10, 20 or 30 c.c. of blood from the mother or father and inject it into the muscles of the back of the baby. By this method one did not have to wait as was necessary when blood serum was used. Using whole blood he had been successful in about three-fourths of the cases; the success of the procedure was dependent on the etiology of the hemorrhage; hemorrhage due to general sepsis was not so amenable to treatment. In his opinion his method of Dr. Schloss was the best and the quickest one available for this purpose at the present time.

Dr. Fenton B. Turck said the exposition of the clinical side of this subject was very interesting, but that he would like to say something of the experimental side of the subject which had a very marked bearing on what the essayist had presented. He had been making comparative tests of the intestinal bacteria on homologous sera. He found that in young children bacterial migration occurred in the same manner as was produced in the experiments upon young animals. The bacteria passed from the intestines very readily into the submucous tissue of the intestinal wall along the entire alimentary tract. The bacteria passed between the cells at the base of the villi, crossing the muscularis mucosa into the submucous areola tissue—the "zona transformans"—and were here destroyed. The antiferment in the serum was found to be reduced by this process. Previously we had found that the administration of chloroform reduced the antiferments in the blood which was the same phenomena that we now find occurs when the intestinal *bacteria* enter the submucous tissue (zona transformans) and come in contact with the sera. It was found that when intestinal bacteria (B. coli) were fed to the pregnant animals they would pass into the fetus and cause reduction of the antiferments resulting in premature births, with hemorrhages and death of the new-born. The study of these experiments gave some suggestions as to treatment. Where there was a reduction of the antiferments in the blood it was unnecessary to theorize about the absorption of toxins, for it was not shown that toxins were formed. The rapidly destructive power was the result of the reduction of the antiferments permitting destruction by autolysis to take place. This phenomena could be demonstrated *in vitro* as *in vivo*. The experiments undertaken in the production of hemorrhagic diseases were important and seemed to prove the value of supplying the deficiency of the antiferment in the sera by the addition of fresh blood.

To the specialists in children's diseases there was an exceptional opportunity of making observations in these cases that are even better than the animal experiments and some of the points have been well shown to-night.

Dr. Hymanson, in closing the discussion, said that in reference to Dr. Chapin's remarks as to the use of diphtheria antitoxin in these hemorrhagic conditions, theoretically it would amount to the same thing whether they used the diphtheria antitoxin or normal horse serum; providing it were fresh. The diphtheria antitoxin also contained the antibodies in addition to the other active elements of the serum and these ought not to hurt the baby.

As to what Dr. La Fètra had said about the advantages of giving fresh human blood by the method of Dr. Schloss, he agreed that this might be better, but the trouble was, that one could not always get a suitable donor in a brief space of time. As an instance of the difficulty of getting a donor, Dr. Hymanson related how one father had refused, saying he had to work fifteen hours a day and needed all his blood; this father had said "Just look at me and see how pale I am." He had used the Board of Health serum and it had certainly worked marvelously well in his experience, though the number of cases that he had treated thus far was not very great.

As to the experimental part, he was not prepared to speak of that, but he was glad to know that this experimental work furnished some justification for the clinical results that had been obtained.

As to the matter of the placental serum, that could be used with ease in maternity hospitals, by allowing the blood from the cord run into sterile flasks, centrifuging and sealing with a few drops of chloroform (chloroform is used as a protective layer for the serum.) Dr. Franz of Graz claimed that this could be kept as long as four months, but here one must have the Wassermann test to exclude syphilis.

A STUDY OF CERTAIN ASPECTS OF EPILEPSY COMPARED WITH THE EMOTIONAL LIFE AND IMPULSIVE MOVEMENTS OF THE INFANT.

Dr. L. Pierce Clark stated that in previous studies of the epileptic constitution and in a psychological study of the meaning of the fit in epilepsy, it had been shown that the fit was a libidinous outlet for the infantile unconscious. The loss of consciousness was thus shown to be due to the insistent demand for expression of the unconscious, transferring the older conception from the negative postulate to a positive dynamic one. In its simplest and crudest form the nucleus of the unconscious striving was a desire on the part of the individual epileptic, not only to return to a state of infancy with the parent, but it really contained a motive for the epileptic to gain the life before birth as symbolized in the idea of life within the mother. In a measure this hypothesis supported by clinical observations seemed to be a sufficient psychological explanation of the fit so far as loss of consciousness was concerned, which was, after all, the real nucleus of the epileptic attack.

However, other questions arose for solution, one of the more immediate being an interpretation of the convulsive movements of the seizure. An examination of the intra- and extrauterine life of the child for the physical correlates of the convulsive spasms of the fit showed a very close parallel of movements at that period which when under certain states of excitation produced acts that were point to point identical to those seen in *grand mal* epilepsy. Probably all the convulsive movements in all the varied types of epileptic fits from the most purposeful and apparently ideational or voluntary seen in the slightest grades of seizures to those of the severest grades were drawn from the different developmental levels of child activities.

As was well known the whole behavior of the nursling was determined insensibly by feelings of pleasure and those of discomfort; the latter, of course, far outweighing the former and diminishing very rapidly in the normal child after the first few months. The intensive longing of the child or the supersensitive epileptic to return to its former state of warmth and protection must be very great. The hampering and unpleasant influence of clothing forcing as it did stereotyped positions, must be alike unpleasant to the child and the epileptic. The latter showed their desire to free the person of clothing in the unconscious and automatic phases of the disease. The attempt to disrobe in the postconvulsive state of epilepsy was common. The same principle undoubtedly caused the instinctive urge in which in the automatic state the epileptic often wandered from his usual abode.

The author devoted considerable time to description of the epileptic cry and the moaning and groaning that accompanied the after-state of the fit. This latter seemed to be quite in the realm of consciousness, but not so the initial epileptic cry; the cry of protest, the corrugated brow and screwed-up face. These found a parallel in the infant reacting most keenly to a strong emotion of displeasure. Most observers had agreed that the cry must be more than a mere mechanical expulsion of expiratory air from the thorax as a sequence of tonic spasm. The combined pleasure-displeasure cry of the infant was not very dissimilar to the epileptic cry when one allowed for the structural difference of the organs involved in the adult from that of the child. Almost invariably one found this peculiar cry in infants associated with tonic-clonic movements of the arms and legs, and Dr. Clark believed that the newer interpretations on the basis of a displeasure-pleasure hypothesis would throw a flood of light on both processes in the infant and in the epileptic attack initiated by this peculiar cry.

The author then traced the analogy of certain movements in the epileptic with those of displeasure movements of the infant such as deflection of the head to one side, a turning away movement; drawing of the mouth to one side and then upward and backward, the quadrangular or squarely opened mouth, which Darwin dwelt upon as an extreme expression of childish rage. It was interesting to note the *tedium vitæ* in the infant and the epileptic alike; the lack luster eye, indolent movements, cessation of spontaneous interest, a falling of the countenance and a paler complexion; all such in the epileptic had been long considered as heralds of a *grand mal* attack. The great importance of a large amount of sleep in the epileptic was comparable with that required by infants. Interruptions of sleep in infants as well as in epileptics during the state after attacks were alike disastrous to well-being or even good temper. The impulsive and incoordinate movements of infancy during sleep and during fetal life had a parallel in the adult in whom such bizarre movements were sometimes seen during sleep and particularly in the epileptic. The infantile poses and postures assumed by epileptics during sleep should be studied more carefully as they furnished an illuminating side light upon the somatic and psychic infantilism of the epileptic. They did not know how these impulsive movements were incited, but their number was not great and might be schematized as those of outstretching and bending of the arms and legs of the newly born. The movements were sometimes so quick as to resemble the cloni of a fit; or they might be slow, then fast, and finally end in cloni or again they might be sinuous. A detailed study of all these and other movements of the infant suggested many of the striking impressions one gained in observing the convulsion of epileptics. Some of the depressors of these impulsive movements were deep, quiet sleep, satiation by food; duplication of the intrauterine state by the warm bath, on the other hand, encouraged them. It was striking that both the infant and the epileptic were little fatigued by the most intense and persistent impulsions which spoke strongly for the unconscious motivation in both their activities.

In conclusion the author submitted that they were justified in considering that the essential nucleus of the epileptic fit was a libidinous one; that it consisted in an infantile unconscious striving of displeasure-pleasure pursuit ending in the final goal of an intrauterine life, attended by a loss of consciousness and a convulsion; that the convulsion was made up of and flowed out of the general libido striving of the fetal and infantile tissues as expressed through the lower spinal centers in inducing simple and crude impulsive movements; that a study of the degree of development of unconscious infantile striving in the psychosexual sphere of the libido, the desire for the fetal intrauterine state of *Allmacht*, was paralleled by the kind and character of impulsive movements found in this infantile period of neuromuscular development. Therefore, the two main settings in the epileptic fit, unconsciousness and convulsion, were psychical and physical correlated; lastly, that epilepsy in its essential pathogenesis was an error or arrest in this fundamental elaboration or development of the psychosexual libido.

The essential pathogenesis of the disorder was still to be attacked.

Whether the latter rested upon an inheritance of certain psychic traits alone or there were certain somatic structural anomalies which did not permit proper psychosexual development into normal adult life, one could not say, but the author believed that such studies as he had presented here and were elsewhere reported narrowed the gap between such causes and their psychophysical expression in epilepsy, and finally, such observations must be of the greatest aid in classifying the recoverable epileptics from the irrecoverable ones. It also pointed the way by which therapeutics might be advanced along the broadest biological lines of educational and moral treatment.

DISCUSSION ON DR. CLARK'S PAPER.

Dr. MacCurdy said that the underlying wish in the epileptic to return to a state of rest equivalent to that which the individual enjoys in fetal life might seem a bizarre conception, but that from his and others experience with the insane it had to be regarded as a frequent type of unconscious wish that came often to open expression in psychoses. From that standpoint therefore he felt fully in accord with Dr. Clark. He then spoke of the importance of the comparison which Dr. Clark had made between the suckling and epileptic, convulsive movements. On the basis of this identity he outlined a possible physiological theory for the origin of the convulsion, on the supposition that the mere loss of conscious control might set all the voluntary muscles into incoordinate motion.

Dr. J. Victor Haberman said that it seemed to him that the logic of Dr. Clark's paper was also unconscious. If the initial cry of the epileptic could be sufficiently explained by the sudden contraction of the thorax forcibly expelling the air through the larynx, why should one not accept this explanation instead of a far less logical one? He had noticed that in all their writings, the Freudians gave no proofs of their theories; they assumed certain things, left it at that, and then asked others to accept their opinion. Dr. H. asked whether the "epileptic voice" (described by Dr. Clark some years ago) was also a cry of the libido; also whether the convulsions in renal disease, and in brain tumor were likewise expressions of the libido? How does Dr. Clark explain the fact that in many cases of epilepsy we find an actual pathological condition? Indeed, some believe, it has even been expressed by Freudists, that all idiopathic epilepsy is due to a pathological (in other words, organic) condition of the brain. How did Dr. Clark correlate these facts?

Dr. Israel Strauss said that he rarely spoke or discussed a paper that dealt with a subject treated from the Freudian standpoint because it was impossible to influence any one who had taken that position. He had very much sympathy with Freud's theories, but he had always thought that the psychanalysis of Freud applied to neuroses and epilepsy was not a neurosis. A study of the brains of epileptics had shown many lesions, and Dr. Clark himself had described changes in the ganglion cells in epilepsy and so it seemed that if looked upon this disease as a neurosis one would have to revise his conception of the pathology relating to it.

Dr. Clark in closing regretted that the tendency of the discussion and the questions asked, contained such a facetious element rather than a genuine attempt at a helpful scientific discussion. It was quite true that the logic and the line of reasoning in determining a psychological basis for unconsciousness must entirely concern the *unconscious* and if the logic and the motive of the mechanism were in accord, so much the better. Because the epileptic cry is *not* satisfactorily explained by any simple mechanical principle, and was so stated in any number of text-books on epilepsy, this fact urged them the more toward finding the other elements as well as the psychical to account for it and thus make clearer this one phenomenon which was so peculiarly unique in the epileptic state. It could be reproduced by imitation, nor was it present in any other phase of nervous disease.

As regards the voice sign, we now had a very good explanation for that phenomenon, also. The essential defect in epilepsy was one in the primary instincts. That being the case, one would expect the condition to show in later life as an effective emotional defect in the epileptic mentality, which was the case (A Personality Study of the Epileptic Constitution, *Amer. Jour. Med. Sci.*, Nov., 1914). If this be granted, we would quite expect there would be an essential incompleteness of emotional expression in epilepsy. Therefore, it was found that as a class epileptics were neither good musicians nor have beautiful voices, and in point of fact a full elaboration of the emotional factors in these individuals as a whole was well shown in the lack of melody and rhythm in their speech.

Of course, it was absurd for us to try to push the epileptic mechanism to explain all convulsions occurring in other disorders purely as a symptom, such as those occurring in renal disease or brain tumor. Everyone knew such symptoms did not constitute the disease of idiopathic epilepsy. The equal presence and absence of any histological lesion in the epileptic brain would make us, on the face of that statement, throw aside any lesion as being *essentially* a causative factor. We must look upon such brain lesions when present as a result of the disorder and not its cause. Again, while it had been possible for many individuals to see a fairly close relation between certain diseases of the motor cortex and the epileptic convulsion, no one had been so bold as to push the law of psychophysical parallelism to the point of making such lesions in the cortex the cause of loss of consciousness as seen in the epileptic attack. Inasmuch as this latter symptom was the one essential factor in epilepsy it was necessary for us to bring into play a defect in some fundamental principle in life which shall be as broadly significant in motive as that which underlays life itself. This was what he had attempted to do. Anyone thinking that the essential logical position he had taken in his papers upon epilepsy were of such extreme character that they had no basis in the fundamental concept of the physiopsychology of brain and mental activity and that epilepsy was not a true neurosis as far as the seizures were concerned, might be enlightened by any number of the profound studies that had recently been made upon this and kindred psychotic disorders. In point of fact, one might say that all the organic lesions in the epileptic brain are but precipitating factors in lowering mental tension or continuing the same, thus permitting certain morbid phenomena in the instinctive life to have their play, as shown in the fit. While the formulation of the principles brought forward might undergo more or less modification, Dr. Clark believed he had outlined a rational and fundamental plan for understanding both the loss of consciousness and the convulsions in epilepsy. As to what might be the precipitating causes of the underlying defect of the epileptic constitution which *permitted* such epileptic individuals to have seizures, was still a question demanding solution.

THE PRESENT CONCEPTION OF CHOREA.

Dr. Israel Strauss said that the cause of chorea had been the subject of considerable speculation and many hypotheses had been advanced to account for it. It had been attributed to a hereditary tendency, neuropathic taint, fright and excitement. The more probable theory was that these were but predisposing causes, the disease itself being of infectious origin. The purpose of the paper was to weigh and discuss these different views. The relation of rheumatism to chorea had been noted and it had been suggested that they were both due to the same agent or one caused the other. Possibly chorea was a metarheumatic condition just as tabes and paresis were parasyphilitic affections. With regard to the embolic theory authorities were not in accord. One authority had stated that fifty-six out of every sixty-three cases of chorea gave a history of rheumatism and Thayer stated that 21.6 per cent. of choreics had had rheumatism. In order to definitely settle the question the etiology must be discovered in both conditions. There was evidence of the presence of the streptococcus in most cases of polyarthritis. This had also been found in chorea by some. Diplococci and staphylococcus pyogenes aureus had been found also in polyarthritis, and much biological work had been done by the different methods, complement fixation, aerobic and anaerobic methods and the results differed widely. Chorea had been known to follow typhoid fever, malaria, malnutrition, syphilis, the abuse of alcohol, etc. It was a disease of early life and occurred most frequently between the ages of six and fifteen years. It was more apt to occur in wet cold seasons. It was frequently febrile in the early stages and gave evidence of endocarditis. The fatal cases showed the rugæ of endocarditis. What influence the cortex had was unknown. The brain lesions were those of acute encephalitis in fatal cases and the question came up to what extent such lesions were present in the ordinary cases. The probability was that this would never be known until some case of moderate chorea died suddenly and an autopsy was obtained. The conclusion was that chorea was probably of infectious etiology, but that the data available at present were altogether insufficient to decide the nature of the infection.

DISCUSSION ON DR. STRAUSS' PAPER.

Dr. L. E. La Fètra said he had come expecting a very different expression of opinion on the subject of chorea and was prepared to disagree, but, on the contrary, he quite agreed with what he had heard. It seemed that chorea must be considered as closely related to polyarthritis and must be considered as due to some kind of bacterial infection in the vast majority of cases.

There were two points to which he wished to call attention: First, in Bellevue Hospital they had made a number of studies of the blood in chorea and in two of these the streptococcus viridans was found in the blood. Complement deviation tests by Dr. Hoobler were found positive in two other cases. In the second place, it had been observed that children who had just recovered from polyarthritis or acute endocarditis frequently developed chorea while still in bed. When the influences that were generally given as exciting causes of chorea were absent, when there was no fright, no malnutrition, no excitement, nothing in the way of nervous shock to account for the development of the chorea, one might feel quite positive that in the majority of cases chorea was an infectious disease. On the other hand, there were some cases that followed so quickly upon fright and nervous shock that it would seem probable that some cases have a different basis.

Dr. Haberman said that no mention had been made of pyschic chorea. He remembered a striking case coming to Professor Starr's clinic some years ago. This patient had so apparently typical a chorea that Dr. Starr was about to show her to the students. To relieve a headache, of which she also complained, the child was taken aside for a moment and treated with hypnosis. On awaking, not only had the headache disappeared but the entire chorea. For several weeks after this, Dr. Haberman treated a large number of choreics coming to the clinic psychically and found that in some the chorea disappeared at once, in others after a few treatments. This could not have been rheumatic chorea. In studying a still larger series he came to the conclusion that psychic chorea is not uncommon and that many if not most of the cases lasting over three months, were of this nature; also that many of the recurring attacks in neurotic and hysterical children who may have had a real chorea in the beginning were psychogenic. The child is on the watch for a new attack, and so gets it. He occasionally shows such a child to his students. The physician told the mother in the child's presence, that the child would have seven attacks before she was cured. She had already now had her fourth. The attack stopped at once on psychic treatment and has not recurred. These cases are all strongly amenable to psychic therapy. There was no way of differentiating the rheumatic from the psychogenic save by the result of treatment. Another series of cases was due to congenital syphilis. Millian in France and Nonne in Germany had called attention to these cases. The former believed that he had found lues so frequently in the heredity of choreic cases that he thought chorea itself must be a manifestation of congenital lues. Few, however, have accepted his view. Nevertheless, there are cases certainly due to this factor. Dr. H. had treated a child recently that had had chorea for three years. The mother was being treated for syphilis, yet none of the physicians seeing her (and the child who was always with her) thought of associating the child's chorea with congenital lues. A positive Wassermann reaction was found. No previous treatment had influenced the chorea. Antiluetic measures brought it to an end within a very brief time.

Dr. Chapin said that Dr. Roger, the French clinician, had studied the relationship of rheumatism, endocarditis and chorea many years ago, and had come to the conclusion that they manifested the same underlying pathological condition, and it really seemed that up to the present time they had not got much beyond his view. It seemed that undoubtedly they were all of an infectious origin. Where one of the three conditions was found one was liable to meet the others.

Dr. Henry Koplik called attention to the importance of seeing these cases of chorea through years, for it might be said of chorea, "Once a choreic always a choreic." To see the heart becoming gradually worse and worse leads to but one conclusion and that is that the poison causing the chorea is producing the endocarditis. The way in which the term rheumatism was used to-day was most unfortunate; it was very much like the former use of the term "malaria." It was probable that the poison causing polyarthritis was closely allied to the one that produced endocarditis and chorea. The question was whether the habit movements were the result of, or continuance of, a condition produced by infection. Dr. Haberman spoke of the cases controlled by hypnotism; these could not be due to the same etiology as that associated with the cases supposed to be due to infection. As to the finding of an organism—in many cases where the blood cultures of cases of chorea had been examined, the technic may have been faulty; in others a mixed infection may have been found. He had had several cases of chorea examined in this way and nothing was found in the blood. It was quite possible that the streptococcus might accompany the true organism. The Klebs-Loeffler bacillus and the streptococcus were frequently found together, but this did not mean that the streptococcus was the cause of the diphtheria and likewise it would probably be found that this streptococcus viridens was not the real cause of the chorea.

Dr. Elias H. Bartley of Brooklyn said they had made cultures at the Long Island College Hospital of three or four well-defined cases of chorea and in none had they found any organism. It might be that their technic was faulty, but nothing grew in any of these cultures. Of course, this was not a large number of cases, and it did not mean that it should lead them to the conclusion that there was no infection, but it did mean that the particular organism which had been mentioned had not been found; if this organism was the cause of the disease it must be constantly found in the disease, and as it was not found to be constant it could not be regarded as the cause of chorea.

Dr. Strauss, in closing the discussion, said that he quite agreed with Dr. Koplik that it was most unfortunate to use the term rheumatism in the way it is done, for no two or three men agreed as to what they meant by the term. But to go to the question of acute polyarthritis and chorea, they could not say that the streptococcus viridans was the agent producing these affections. At Mount Sinai Hospital Dr. Libman's work was such that they were certainly competent to isolate this organism if it was in the blood, and yet they had not isolated it from the blood in chorea though they had made cultures both aerobically and anerobically. He did not believe that if the streptococcus viridans was there it would have been missed. Another point in connection with the relationship of chorea to rheumatism, was the treatment. In chorea one did not get good results from the use of the salicylates; they did not get the results that they did in polyarthritis. On the other hand, they had tried neosalvarsan in chorea and sometimes with surprisingly good results. This suggested that a protozoon might be involved. They had no right to say, however, that because rheumatism occurred and was followed by chorea the latter was due to the same cause as the former, neither could they say that because endocarditis had been found in 21 per cent. of the cases of chorea that the endocarditis and the chorea were due to the same cause. They could not say that rheumatism, endocarditis and chorea were in the same etiological chain. When they had a severe case, they could, as a rule, save it no matter what they did and they might find an acute parenchymatous nephritis, endocarditis, or even an acute encephalitis and yet one could not say that these cases were due to infection always Therefore, although we may say chorea appears in association with and follows other diseases which are due to infection we are not justified at present in any more definite statement of its etiology.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Bilateral Congenital Caput Obstipum.—A number of theories have been advanced to explain cases of congenital wry neck. Most of the hypotheses are applicable only to cases where deformity is limited to one side. And while unilateral cases greatly predominate, double congenital wry neck is a possible though very rare deformity. An instance of the latter kind has been observed by A. H. Morse (*Surg., Gyn. and Obst.*, 1915, xx, 74) in the Woman's Clinic of the University Hospital, and inasmuch as the mother was delivered at the onset of labor by Cesarean section there can be no doubt that the deformity of the infant existed during intrauterine development and was independent of birth-injury. The most reasonable explanation for the shortening of both steromastoid muscles in this case it would seem was the partially extended position of the head *in utero.* This was referable to pelvic contraction and restriction of fetal movement in consequence of a relatively small amount of amniotic fluid. After four months the deformity disappeared.

Infantile Scurvy.—Infantile scurvy is a disorder characterized clinically by hemorrhage, for example, bleeding into the gums and subperiosteal hemorrhages of the long bones. A study of the cause of this bleeding, which includes a consideration of the clotting power of the blood, forms the nucleus of an investigation by A. F. Hess and M. Fish (*Amer. Jour. Dis. Child.*, 1914, viii, 385). For the coagulation tests blood was aspirated directly from the blood-vessels and oxalated. This plasma showed a slight diminution in clotting power. This defect did not seem, however, to be the result of an insufficiency of calcium. The antithrombin was not increased. Small amounts of blood were also obtained by puncture of the finger. Examinations of this blood revealed a normal number of blood platelets. In other respects the picture was that of a simple secondary anemia, except that the hemoglobin was diminished out of proportion to the red blood-cells. A marked regeneration of these cells during convalescence, leading to a polycythemia, was also noticed. These departures from the norm are insufficient to account for the hemorrhages associated with the disease. The integrity of the blood-vessels was therefore investigated by the "*capillary resistance test.*" This consists in subjecting the capillaries and vessels of the arm to increased intravascular pressure, by means of an ordinary blood-pressure band, and of observing whether this strain results in the appearance of petechial hemorrhages into the skin. The vessels of normal infants were found to withstand, without apparent disturbance, 90 degrees of pressure for three minutes, whereas the vessels of infants suffering from scurvy gave way under this pressure. The test is not specific for scurvy, but is a method of demonstrating a weakness of the vessel walls, whatsoever may be its cause. Numerous petechial hemorrhages of the skin or mucous membranes were frequently noted as one of the earliest signs of scurvy; no sign, however, should be regarded as preeminently the primary symptom of scurvy. It is generally recognized that scurvy has not only an exciting cause, but a predisposing cause. The well known "exudative diathesis" of Czerny was found definitely to predispose to the development of scurvy. Whether there are other predisposing factors remains to be determined. Several cases of scurvy developed in infants who were being fed on milk which was pasteurized to 145° F. for thirty minutes. They were cured by receiving fruit juices or raw milk. Orange juice was found not to lose its efficacy as the result of being boiled for ten minutes. The juice of the peel was successfully substituted as an antiscorbutic for the juice of the orange. Potato proved to be an excellent antiscorbutic. It is suggested that it be added to pasteurized milk as potato-water instead of the barley-water which is now commonly used as a diluent. In this way the necessity will be obviated of giving orange juice. Cod-liver oil or olive-oil, although given for weeks, did not prevent the development of scurvy.

Relation of the Blood Condition and the Constitution to the Weight and Nutrition of the Child.—A. O. Karnitsky (*Jahrbuch. f. Kinderheil.*, Oct. 6, 1914) studied eighty children whom he was able to observe from birth, fifty-two for the age during which nursing is carried on, and ninety-three older children. His especial object was to study growth and development of the child at various ages when no known hereditary taint or chronic disease was present. The author believes that, in order to be of value, such a study must be made by individualizing and by a physiologico-clinical method and not by a generalizing statistical method. He concludes that the growth of the body ends at the seventeenth to the eighteenth year, not at the twenty-fifth year. The period of life influences the amount of growth and weight gain of the child. There are several types of growth and development: the normal, euplasia; the increased, hyperplasia; and the delayed, hypoplasia. In the normal type the quantitative and qualitative growth and development forms a curve which follows that of the body-weight and blood curve. In pathological forms of growth there is no such parallelism of the weight, nutrition and blood quality; weight and blood quality show qualitative and quantitative variations which may be grouped as follows: (a) Without notable disturbance of the correlative function in the growing organism of the child. (b) With marked disturbances of the correlation between weight, nourishment and blood condition. A properly cared for and breast-fed child will show no variation of the weight curve from the normal. The eruption of the teeth is a physiological act and produces no disturbances of health of any kind. The nourishment and surroundings are often the cause of a pathological form of growth and development. In children from six months to two years of age there is a regular increase in the quality of the blood. The minimal, maximal, and medium number of red cells and hemoglobin content of the blood must be considered in relation to the health and constitution of the child under observation. There is a relation between the energy of the constitution of the child and its blood condition.

Internal Hydrocephalus.—In the experimental, clinical and pathological study of W. E. Dandy and K. D. Blackfan (*Amer. Jour. Dis. Child.*, 1914, viii, 406) an internal hydrocephalus was experimentally produced in dogs by placing an obstruction in the aqueduct of Sylvius. It is therefore evident that the cerebrospinal fluid is formed in the ventricles faster than it can be absorbed, and that the aqueduct of Sylvius is essential for its escape. An internal hydrocephalus resulted from placing an obstruction in the aqueduct of Sylvius in spite of the extirpation of the choroid plexus of both lateral ventricles. This procedure apparently modifies the grade of the internal hydrocephalus. An internal hydrocephalus may also result from an experimental ligation of the vena Galena magna near its origin; when the ligature is more distally placed or when the sinus rectus alone is ligated, an internal hydrocephalus does not result, owing to the efficient venous collateral circulation. Cerebrospinal fluid is derived mainly from the choroid plexuses, probably both by filtration and by secretion. An increase of cerebrospinal fluid is caused by general venous congestion as demonstrated by temporary jugular compression. This increase of fluid ceases when the congestion is relieved by the collateral circulation. Drugs and glandular extracts produce but slight change in the rapidity of formation of cerebrospinal fluid. Pilocarpin produced a slight increase. There is a definite impermeability of the fluid-forming structures. Of the various substances in solution in the blood, only traces of a few find their way into the cerebrospinal fluid. The cerebrospinal fluid is more strongly protected from substances in the blood than the peritoneal, pleural and pericardial fluids. There is a rapid and constant formation and absorption of cerebrospinal fluid. A new supply is formed and absorbed at least every four to six hours. The lymphatics play a negligible part in the absorption of cerebrospinal fluid. Cerebrospinal fluid is absorbed directly into the blood. Absorption is from the entire subarachnoid space. It is a diffuse process and does not take place through specialized structures such as the pacchionian granulations or through stomata opening into the venous sinuses. That stomata do not exist is demonstrated by the fact that granules do not readily pass from the subarachnoid space into the blood. There is practically no absorption from the ventricles. The maintenance of an equilibrium between the formation and the absorption of cerebrospinal fluid necessitates a communication between the ventricles and the subarachnoid space. Communication is solely by the foramina of Magendie and Luschka. After the introduction of phenolsulphonephthalein into the subarachnoid space it soon appears in the lateral ventricles. There are therefore no valves at these openings. If an obstruction exists at the aqueduct of Sylvius, phenolsulphonephthalein does not appear in the spinal fluid. The so-called foramina of Mierzejewsky and Bichat therefore do not exist. Granules placed in the subarachnoid space, without pressure, are soon uniformly distributed throughout the entire spinal and cerebral subarachnoid space. There is no evidence of a current to the region of the venous sinuses. Granules pass along the olfactory and optic nerves, over the gasserian ganglion of the trigeminal nerve and a short distance along the auditory nerves, but not along the remaining cranial and spinal nerves. Internal hydrocephalus can be divided into two anatomically different types, depending on the patency or occlusion of communication between the ventricles and the subarachnoid space. In seven patients with internal hydrocephalus lack of communication was demonstrated clinically. In each of these seven cases there was practically no absorption from the ventricles, while the subarachnoid absorption was high. The internal hydrocephalus, therefore, resulted because the passage of fluid from the ventricles into the subarachnoid space was prevented. Four cases of internal hydrocephalus in which there was communication between the ventricles and the subarachnoid space were studied. In these cases there was a low subarachnoid absorption. Meningitis was the cause of the hydrocephalus in two patients with the obstructive type and two with the communicating type of hydrocephalus. The probable cause of internal hydrocephalus following the excision of a meningocele is the limitation of absorbing surface and consequent diminution in the absorption of cerebrospinal fluid. Surgical treatment differs according to the variety of internal hydrocephalus. In the obstructive type the obstruction must be removed. In the communicating type it is necessary to increase the area for the absorption of fluid.

Rupture of Tuberculous Tracheo-Bronchial Glands into the Air Passages of Children.—Mare. Paunz (*Jahrbuch. f. Kinderheil.*, Oct. 6, 1914) says that the localized tuberculosis of the tracheo-bronchial glands is one of the most frequent forms of tuberculosis in children. It is generally secondary, the result of tuberculosis of the lungs. Some lesion of the lungs is always to be found, although it may be very slight. Such a tuberculosis is almost always an inhalation tuberculosis. The author gives a summary of the anatomy of the tracheo-bronchial lymphatic glands. There are a great many of these glands, and they may be divided into several groups, as to location. These glands may become caseous or soften and thus produce changes in the neighboring bronchial tubes or the trachea. The principal results are compression of the air passages and rupture into them. Out of 249 cases of tracheo-bronchial gland tuberculosis the author found in 27 perforation of a bronchus, 15 on the right and 12 on the left side. Sometimes there were two or three perforations. As soon as infection of the glands has taken place swelling and inflammatory reaction of the gland occur, generally of several at the same time. Usually there are formed typical tubercles which become confluent, soften or become cheesy. There is a periadenitis with adhesion of the mass to a neighboring bronchiole. Rupture may occur slowly or suddenly. Masses of cheesy or purulent matter are forced into the lumen of a bronchiole, and are aspirated into the ultimate radicles of the bronchi, causing a cheesy pneumonia. In some cases a large blood-vessel is opened, causing hemorrhage of importance. They may open into esophagus, the pericardium, or pleura, causing pericarditis, empyema, or pneumothorax. On the other hand a cure may take place by thickening of the surrounding tissues, encapsulation, and calcification. These encapsulated masses may be brought back to activity by measles or a pertussis and cause a diffuse lung tuberculosis, a cheesy pneumonia, a tuberculous meningitis, or a miliary tuberculosis. In a few cases the cheesy masses are coughed out and a cure results. The rupture may be preceded for a long time by a metallic cough and dyspnea denoting pressure on a bronchus. The dyspnea in these cases is accompanied by a loud clear voice, which shows that it is not laryngeal. The breathing sounds will be found absent or weakened over the compressed area. When masses are aspirated there are marked symptoms of suffocation as if a foreign body has been aspirated, and these symptoms may be caused by comparatively small masses. Subcutaneous emphysema may also be produced. There may be dysphagia, violent attacks of cough, with bad smelling breath, and expectoration. Slight dilatation of veins on one side of the thorax and edema of the face may also result. The von Pirquet reaction may be negative or weakly positive in this kind of gland tuberculosis. The *x*-ray picture is a great help in diagnosis. Tracheobronchoscopy is of the greatest assistance in diagnosis. In case of rupture tracheotomy may permit us to locate, and even remove, the mass of caseous material. These cases should be handled as if there were a foreign body, by first a tracheotomy, then tracheobronchoscopy. Out of ten cases so treated by the author seven were cured.

Meningism in Scarlatina and Scarlatinal Uremia.—Pierre Mauriac and P. Philip (*Ann. de méd et chir. inf.*, Oct., 1914) discuss the condition seen in scarlatina when the symptoms are similar to meningitis, but in which the duration of the condition is comparatively short and recovery rapid. They ask whether we should consider this a true meningitis or no. This condition also occurs in the uremia of scarlatina. Weil reports such a case in a soldier who in the course of scarlatina presented symptoms that led to the diagnosis of the cerebrospinal meningitis; the cerebrospinal fluid showed many lymphocytes and the pressure was increased. Still at the end of a few days the symptoms disappeared. Again these meningeal states in scarlatina end in death. The authors conclude that in the presence of a scarlatina we should always be prepared for meningeal complications. When there are no complications in ears and nose, and no uremia, simple meningeal reaction without a true meningitis will explain the condition. But on this meningeal condition in weak children may be grafted all sorts of other infections, which explain acute meningitis in the course of scarlatina. If uremia occurs the meningeal symptoms may be due to intoxication and the prognosis depends on the retention of nitrogen. But when convulsive symptoms appear suddenly with a high temperature and meningeal symptoms we may expect an acute infection added to the uremic intoxication acting on the cerebrospinal axis.

Congenital Cyanosis without Auscultatory Signs.—M. Grandjean (*Ann. de méd. et chir. inf.*, Oct., 1914) described a form of congenital cyanosis which shows at autopsy a uniform contraction of the pulmonary artery, and an equal thickness of the walls of the two ventricles. In these cases there are no auscultatory signs of the heart condition. This is one form of "blue baby." The heart appears larger and heavier than normal, and this hypertrophy is greater the longer life is prolonged. There is a loss of substance of the interventricular wall. The entire pulmonary artery and its branches are diminished in caliber. In some cases there is an entire absence of the pulmonary artery, and complete transposition of the aorta and pulmonary artery. There is no murmur or thrill because there is no inequality of pressure between the right and left hearts. There is no inequality in the contraction of the pulmonary artery and hence no vibration of an obstructed blood current. In these cases the cyanosis is complete, involving all parts of the body and limbs, conjunctiva and ears. At the slightest cry or exertion it deepens. The extremities are cold, crises of suffocation occur. Auscultation gives almost no signs except an enlargement of the cardiac area of dulness. The prognosis is always bad, though some children have lived to be as old as fifteen years. The child is in a state of least resistance and is subject to any infection that may approach him: the lung insufficiently supplied with blood renders him subject to tuberculosis and pneumonia. Even measles is sometimes fatal.

Active Immunization in Diphtheria and Treatment by Toxin-antitoxin.—W. H. Park, A. Zingler and M. H. Serota (*Jour A.M.A.*, 1914, lxiii, 859) have found that active immunization produced a very decided increase of antitoxin in a relatively short time in all persons who had natural antitoxin. These, however, were immune to diphtheria before the injections were made. In a series of 700 scarlet fever patients of varying ages tested for natural immunity by the Schick reaction, 400 gave a negative reaction. Fifty-seven per cent. were, therefore, naturally protected and needed neither active nor passive immunization. Less than one-quarter of the remaining 43 per cent., which were probably susceptible to diphtheria, reacted to active immunization with mixtures of diphtheria toxin and antitoxin to a degree sufficient to immunize them surely. A larger percentage developed a trace of antitoxin which was possibly enough to give a slight protection. Those who are definitely exposed to infection should be passively immunized even if the toxin-antitoxin injections have been given. The use of the Schick test will eliminate the necessity of immunizing about two-thirds of those subjected to exposure, as judging from a year's experience, those not reacting are immune. Those found to be naturally immune probably continue immune for a considerable period of time, possibly indefinitely. Active immunization is indicated when there is no immediate danger of infection and when it is desirable to lessen the number of susceptible persons. It is too early to decide whether active immunization should be attempted on a large scale. The lack of a sufficient response of at least 50 per cent. of those susceptible to diphtheria and the fact that the immunity lasts for but one or two years are drawbacks that will probably limit to some degree its usefulness.

Pemphigoid of the New-born.—In an epidemic of nine cases of "infantile pemphigoid" (pemphigus neonatorum) recorded by H. W. Cole and H. O. Ruh (*Jour. A.M.A.*, 1914, lxiii, 1159) it was possible to isolate in pure culture the *Staphylococcus aureus* in all cases in which unbroken vesicles were to be found. In one case the termination was fatal and a coccus was found in the internal organs at necropsy. The epidemic was started from a case of typical pemphigoid of the new-born, which later changed into a clinical picture of dermatitis exfoliativa neonatorum, and as the etiologic agent in the two diseases is the same, the writers believe there should be no distinction between them. Impetigo contagiosa seu vulgaris seu bullosa (streptogenes) should be sharply differentiated from infantile pemphigoid because of its different bacteriologic origin. Cole and Ruh believe that infantile pemphigoid (pemphigus neonatorum) should be placed among the reportable diseases because of its severe epidemic characteristics and high mortality (from 25 to

50 per cent.). Because of the striking results obtained in their epidemic, they recommend the use of an autogenous vaccine in all cases of infantile pemphigoid.

Goiter in Children.—C. G. Buford (*Surg. Gyn. and Obst.*, 1915, xx, 35) says that simple goiter is of frequent occurrence among children in Chicago and is associated with a definite symptom-complex. This symptom-complex indicates a low grade of health varying in each child. Goiter usually occurs in certain geographic districts and appears most frequently when certain waters are used for drinking. These often contain sewage. Drinking water is probably the chief cause of goiter. The water content causing goiter is probably bacteria or their chemical products. Focal infections, particularly those of the tonsils, adenoids, and teeth of children, may supply the excess of bacteria ingested and produce goiter singly or in conjunction with the water supply. If these theories are correct the thyroid gland, which enlarges under these conditions, is an agent in the destruction of bacteria, as the blood passes through it in such great abundance, or it provides a product to destroy these or their toxins in the blood. When the work of the gland is excessive it enlarges through hypertrophy; when compensation is incomplete or the dose continuously large or toxic, constitutional damage follows. Because of the location in which hypertrophy usually begins, differentiation in function of the various areas of the thyroid gland is suggested. Because invasions of the thyroid gland beyond the primarily enlarged nodule usually occur in the lobules immediately surrounding it and this zonal plan of extension often continues but only in toxic cases overlapping function of the lobules is suggested. The primary nodulation is a hypertrophy of compensatory character; if the cause is not removed the original lobe to take on enlargement continues to increase in size and results in cell damage; the process may extend to other lobules; the involved cells either become useless or the secretion of the lobule becomes toxic and there is spontaneous encapsulation; probably the capsule is firm and thick in proportion to the damage to its contents or the toxicity of its secretion. These lobules in the lower pole of the right lobe, rarely in the left, are the common seat of benign adenomata of adults. Because we do not often see this type of goiter in adolescents there must be usually a spotaneous recovery during childhood. Many cases of this type of goiter improve locally and some disappear on the giving of thyroid or the removal of focal infections, or both, while in all there are marked constitutional improvements.

Production of Immunity by Tonsils and Adenoids in Children.—J. Zahovsky (*Jour. Mo. State Med. Assn.*, 1914, xi., 255) states that acute infection of the tonsil with a normal reaction rapidly immunizes the body against a variety of infections and thereby protects the bronchial tubes and lungs. Hyperplasia of the lymphoid structures of the nose and throat which does not react in attacks of acute infections, does not show any marked influence on the production of immunity to respiratory diseases. Hyperplasia of the lymphoid structures of the nose and throat, attended by recurrent attacks of inflammation, not exudative, show a defective immune-producing power of the body.

Simple Syringe Method for Transfer of Blood from Donor to Recipient.—This is described by A. Zingher (*Arch. Pediat.*, 1914, xxxi, 912). The entire outfit consists of one or two 20- or 30-c.c. "Record" syringes and needles of steel or platinum-iridium (B. & S. gauge No. 16 or No. 17). · Two all-glass 25-c.c. "Luer" or "Burroughs-Wellcome" syringes with steel (B. W. & Co. No. 9) or platinum-iridium needles (Burroughs-Wellcome & Co. No. 23) will answer the purpose as well. In an emergency any 10- or 20-c.c. syringe with a sharp, clean needle can be used. As a tourniquet a small piece of rubber tubing and an artery forceps may be employed. The donor is seated near the patient, who is in a recumbent position. The donor's veins at the bend of the elbow are made prominent by applying the tourniquet at the middle of the upper arm, care being taken not to obliterate the pulse. The skin is sterilized with alcohol and the median-cephalic or median-basilic vein is chosen. Places of injection on the recipient are also sterilized with alcohol or tr. iodine. As soon as the syringe is filled from the donor's vein, an assistant loosens the tourniquet and applies an alcohol sponge with slight pressure to the puncture opening. The operator immediately injects the blood into the muscle of the recipient, inserting the needle almost perpendicularly to the skin in adults, but more obliquely in children on account of the thinness of the muscle. After the injection the syringe and needle are thoroughly washed in sterile normal saline, which is kept ready in a glass beaker. The entire time required for the aspiration of the blood and its injection need not exceed sixty seconds, a period which is far below the usual coagulation time of blood. The procedure is now repeated, using the other arm of the donor. For the third injection we go back to the arm originally used, and insert the needle through the same opening in the skin, being guided thereby into the original opening in the vein. If care is taken, no hematoma will form, and five to ten syringefuls of blood can be withdrawn from each vein. The injections are painless except for the temporary slight discomfort caused by the insertion of the needle. The injection of homologous blood into muscle produces no inflammatory reaction and the resulting absorption is complete within three days, of the serum part alone probably in a few hours. The injection of homologous blood into subcutaneous tissue produces inflammatory induration and discoloration of the skin, and the resulting absorption is very much delayed. The availability of the method would recommend its further trial in the treatment of scarlet fever and other conditions in which transfusion of blood and serum injections have been advised.

Etiology and Pathology of Bone and Joint Tuberculosis. J. Fraser (*Jour. A. M. A.*, 1915, lxiv, 17) sums up the etiology of tuberculosis of bones and joints as follows: Synovial tuberculosis is readily produced, and the synovial membrane is infected by the blood-stream. Healthy bone cannot easily be infected with tuberculosis; its marrow must first undergo a gelatinous or fibromyxomatous degeneration, and such a degeneration is the result of a tuberculous toxemia and of a tuberculous endarteritis of the vessels supplying the bone, the nutrient vessels or the metaphyseal. In a bone, the marrow of which becomes so altered, tuberculous osteomyelitis develops. The disease may begin in the center of the diaphysis, in the metaphysis or in the epiphysis; and whether the epiphysis or the metaphysis is attacked depends on the situation of the reflection of the synovial membrane. If the reflection lies only in relation to the epiphysis, then the epiphysis is attacked, and if it is in relation to the metaphysis, the latter is the seat of the disease. The probability is that the bacilli become originally deposited by an extravasation of the blood from one of the blood vessels, the wall of which has been previously weakened by endarteritis. A slight sprain may be the trauma. In the effused blood the bacilli develop, and as in tuberculosis elsewhere the result of their growth is the formation of a small tuberculous follicle. As the follicle enlarges, others appear around it, and, amalgamating, may form a mass of considerable size. Coincident with development of the follicle caseation occurs in the center of the follicle, and at its periphery is an attempt at fibrosis and localization of the follicle. The changes in the marrow are an early or cellular, and a later or fibrous. The cellular change is a neutrophil leukoblastic reaction, at first of immature cells but later of fully developed polymorphonuclear neutrophils. This, which one may term the acute reactionary stage, lasts for about 120 hours from the date of the original infection. The character of the cells then begins to change, the polymorphonuclears diminish in number, and are replaced by two varieties of cells—a small lymphocyte and a type of immature lymphocyte or large mononuclear cell. The cellular reaction of the marrow continues as long as the disease is increasing in extent, as long, in fact, as active phagocytosis is necessary. When the growth of the disease becomes arrested the cellular reaction disappears and the marrow passes into the series of changes which end in fibrosis. The change is inaugurated by a disappearance of the specialized cells (lymphocytes) with a corresponding increase in evidence of the fat cells, and the appearance among the latter of young connective tissue. This connective tissue develops from two sources: (*a*) from the connective-tissue corpuscles which lie scattered among the fat cells, and (*b*) from the connective-tissue fibrils which exist in the perivascular tissues. These marrow changes are the result of specific demands. The primary infection is that of an irritant, and as such it calls forth a simple leukoblastic reaction. With the development of the lesion the specific action of the tuberculous tissue becomes evident, and the result is the production of cells specially antagonistic to tubercle, namely, the lymphocytes. When the antagonistic attitude is no longer demanded, the marrow undergoes a sclerosing change in order to limit and encapsulate the focus. When tuberculosis develops in a bone, the surrounding lamellæ undergo distinctive changes. These changes are of two possible varieties, rarefaction of the lamellæ—osteoporosis—and thickening of the lamellæ—osteosclerosis. It is usual to find the two types occurring together. Rarefaction of the lamellæ is brought about by true absorption of the bone, or by a variety of metamorphosis. Osteoclasts are the medium when absorption is the end in view. The metaplasic is the second method of rarefaction, and of the two it is the more common. A lamella is built up of a dense connective tissue, impregnated with lime salts. In the process of metaplasia the lime salts disappear and the fibrous elements remain. These two methods of rarefaction may and do occur synchronously in the same specimen. Osteoblasts derived from the connective-tissue cells are the factors by which the lamellæ increase in thickness. This new bone possesses pecularities which distinguish it from the old: it contains a greater number of bone corpuscles, it stains a lighter color, and the junction line between the old bone and the new is sharp and distinct, with an edge which is often irregular. The process of osteosclerosis is indicative of the more chronic types of bone disease. Subperiosteal thickening is one of the earliest features of tuberculous disease of the underlying bone. The activity of the periosteum depends on an increased vascularity secondary to the underlying disease. The deposited bone is one of two kinds, porous bone or dense bone, and with each the method of formation differs. In the former, a preliminary roughening of the surface by excavation by osteoclasts is followed by deposition of a layer of new bone by osteoblasts, and appearance of conical projections which eventually unite, forming arches. Successive series of arches are in this way deposited. Occasionally the new periosteal bone is compact. The preliminaries are similar to those in the deposit of porous bone, but in the later stages no arches are formed, the bone remaining compact throughout. This is the method of deposit which one finds occurring in the neighborhood of joints. The more profuse porous bone might easily interfere with the mobility of the joint. Endarteritis obliterans is of frequent occurrence in bone tuberculosis. The disease affects the smaller vessels and occasionally the primary divisions of the nutrient vessel. The changes closely resemble those which occur in syphilis, but the changes in the tunica adventitia illustrate a distinctive feature. In syphilis the exernal coat is infiltrated and surrounded by a number of small lymphocyte cells; in the endarteritis of tuberculosis no such cells are to be found; instead there is a development of perivascular connective tissue. The condition arises from the circulation through the vessels of a tuberculous toxin. The change has far-reaching results; the narrowing of the vessel lumen gives rise to considerable disturbance in nutrition, and many of the fibroid changes in the marrow are sequelæ to it. Further, the disease of the vessel wall has an effect on the local development of tuberculosis. Many of the cases of so-called primary tuberculous disease occurring in the metaphysis of the long bones, the short long bones, and the short bones owe their origin to an antecedent endarteritis of the larger blood vessels. The gross pathologic varieties of osseous tuberculosis are described as of four different varieties: (1) the encysted, (2) the infiltrating, (3) the atrophic, and (4) the hypertrophic tuberculous lesion.

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ORIGINAL COMMUNICATIONS

A STUDY OF SCOPOLAMIN AND MORPHINE AMNESIA AS EMPLOYED AT LONG ISLAND COLLEGE HOSPITAL.*

BY

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BEFORE taking up the consideration of the application of scopolamin and morphine amnesia in abnormal obstetrics there are certain questions which the obstetrician must answer to the satisfaction of the profession.

First: Is twilight sleep, as it is called, a reality or a fad?

Second: Has scopolamin amnesia actually a place in rational obstetrics?

Third: What advantages can be gained for the patient by its use?

Fourth: Is the child really subjected to a greater danger when this adjunct to labor is employed?

Fifth: Is its employment feasible in abnormal cases and what are its limitations and contraindications?

Experience has shown us that it is possible to produce a satisfactory *Dämmerschlaf*, as it is called by the Freiburg School, in 85 to 90 per cent. of the cases subjected to this treatment. Dämmerschlaf is the application of partial narcosis to labor by the administration of morphine and scopolamin. The narcosis is so light as to eliminate only the memory of subjective pain, without interfering with the uterine contractions. The patient should have no recollection of the sequence of occurrences and wakes hours afterward

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refreshed, with the mind a blank as to the events through which she has passed. This satisfactory effect can only be produced by individualizing patients, using the minimum dosage, and in the proper surroundings. The environment and type of women has much to do with the success or failure of "twilight." The intelligent, highly strung, nervous woman is the best subject.

The exceptional results of Gauss have been obtained (1) by individualizing the patient and so minimizing the dose of the drugs employed; (2) by giving each woman the full test of labor without reducing her physical strength by subjecting her to the nerve-racking pain of prolonged labor; (3) by limiting the number of vaginal examinations, following the course of labor by abdominal and rectal palpation; hence all operative procedures were done in dilated passages and trauma to the soft parts and infection were reduced to a minimum.

It should be distinctly understood that the conduct of labor under scopolamin demands a fundamental knowledge of obstetrics and the obstetric art, as well as the ability to recognize and meet complications as they arise. Its employment has the *same relation to the first stage of labor* as the administration of chloroform or ether to the perineal stage. When intelligently employed it is a useful adjunct to the woman's comfort. Its employment is making us all more careful and competent obstetricians; we are observing more critically, and the condition of the child is receiving greater consideration.

We have, through the courtesy of my associate, Dr. Ralph M. Beach, been permitted to study the end results from the records of nearly 1300 cases in America, the data of which he has compiled, and compared with a similar series of cases in which twilight was not employed. These tables are convincing in that they prove that Dämmerschlaf is a reality, not a fad.

The advantages of painless labor to the woman are: that it permits us to give each woman the full test of labor without reducing her physical strength by subjecting her to the nerve-racking pain of a prolonged first stage, with less nervous shock, less muscular effort, and easier and more prompt dilatation than can be obtained without its use. This ensures better preparation of the soft parts, with diminished trauma, less liability to intervention, and consequently less sepsis.

It cannot be denied that suffering exhausts more than physical effort. Anyone who has seen one of these women a few hours after a twenty-four- or thirty-hour labor under "twilight" cannot fail to be impressed with the absence of all evidences of exhaustion. Neither can it be denied that our present-day women are poor obstetric risks. Modern civilization has left a definite impression upon the physiological functions of our women. The character of their labors has been changed. Primary inertia is not uncommon before complete dilatation of the cervix is obtained. Excluding hard part obstruction and inflammatory changes in the cervix, nervous exhaustion is the most potent cause for this inertia. After labor is once established Dämmerschlaf eases the pain, relieves the restlessness, but does not interfere with the efficiency of the uterine contractions, and so expedites dilatation. Soft part injuries are minimized, and we feel that the greater care and watchfulness given these women during their confinements actually makes their labors safer. We have educated the public how to prevent disease; they are going to educate us how to prevent the disasters of childbirth by insisting on better prenatal and interpartem care. Even now they insist on routine antepartem examinations of the pelvis, of the urine, of the blood pressure, and mensuration of the fetus.

Painless labor by partial narcosis with scopolamin and morphine is therefore an assured fact, and when used properly in selected cases where the pelvic relations are normal, or approximately normal, permits nature, to take time to prepare the cervix, the vagina, and the vulvovaginal orifice for the passage of the fetus without producing physical or muscular fatigue or effort in the mother. This has been shown in our experience at the Long Island College Hospital, and in that of my associates Drs. Beach and Holden, by the diminution in the number of lacerations produced as well as in the reduction of the number of forceps operations performed in primiparæ. Our observations prove that scopolamin and morphine actually shorten the first stage of a primiparous labor by more promptly overcoming the soft part obstruction. This is not so, however, with the second stage, which may be prolonged beyond safe limits if too much morphine has been used or if the operator has attempted to induce twilight sleep too late in labor.

Scopolamin-morphine amnesia is not without danger; neither is the production of narcosis with ether free from accident or complication. Yet in the proper hands these dangers are and can be minimized. Certain women take ether poorly; so certain women are poor subjects for the induction of twilight sleep. Our experience has shown us that where it is difficult to produce amnesia that it is safer to discontinue the use of the drugs. Probably further experience will indicate to us where the difficulty lies. Failures may be averted, to a large extent, by intelligent administration, careful observation of the fetal pulse rate, individualization of the patient, minimum dosage, proper surroundings, and the free exhibition of water throughout the narcosis.

It is claimed by the critics of this method that the child is apt to be asphyxiated and narcotized. This is not the fault of the method, but the fault of the dosage, and of the individual using it. The child does participate in the twilight sleep to some extent and may suffer from oligopnea for several minutes, and it is common for the cry to be delayed for a minute or two after birth, though the fetal heart may show no disturbance in either rate or rhythm. *Cyanosis*, however, *is the exception*, *unless the dosage has been too large*, or *given at too frequent intervals*, or *too late in the labor*, or *the second stage has been allowed to continue too long.* We can see no reason why, because scopolamin has been given, that the ordinary obstetric rules as to the management of the second stage should be disregarded. Yet this has been the fact in many of the reported cases. The child, after stretching itself as if awakening from a restful sleep, cries as lustily as the ordinary new-born infant, if the method has been employed with the same intelligence that would be given to the use of an anesthetic in the second stage of labor. Our experience convinces us that the induction of twilight sleep is distinctly a first-stage procedure and should not be begun if the labor is too far advanced. Our own experience as well as the collected statistics of Dr. Beach show that the actual fetal mortality is lessened by the employment of this form of anesthesia.

Contrary to the popular idea of twilight sleep which is advanced by those women who have had successful deliveries here and abroad under its influence, we wish to impress upon you that its employment has distinct limitations in abnormal cases, and must be used with judgment in all. It is particularly indicated in nervous women of the physically unfit type in their first labor, for it is in this type of women in ordinary practice that labor has most often to be terminated artificially, owing to the physical exhaustion so common at the end of the first stage, before cervical dilation is complete, or in the second stage when no more muscular force can be brought upon the uterus by the undeveloped abdominal muscles. The usual obstetric interference by forceps in unprepared soft parts results in a permanent morbidity, and is the largest contributor to our collection of chronic invalids. It is in just this class, the physically unfit, that scopolamin will give the best results, for by its use we are able to obtain full dilatation of the cervix by operation of the normal physiological factors, namely, the bag of waters and the force of the uterine contractions before the patient begins to show signs of physical tire. In dry labors the exquisite pain which is produced by pressure of the presenting part on the congested, sensitive cervix is relieved by the administration of scopolamin and morphine, and the cervical ring is relaxed. Consequently the presenting part is driven through the pelvis and later into the vagina, and low forceps in dilated passages is the most serious intervention to which the woman is subjected. This statement is proven by the marked diminution in the number of high and medium forceps instituted when twilight sleep has been used.

Border-line disproportions also offer another indication for its use, for all primiparæ with border-line contractions should be given a test of labor before instituting operative measures. This means that the cervix must be dilated, the membranes ruptured, and the uterine contractions aided by a tight binder and proper posture, and the patient be given a chance to drive the presenting part into the pelvis. This all takes time and effective labor pains, and these patients are in need of rest between contractions, because having pain is work, and work exhausts. Under scopolamin amnesia and analgesia this same woman may be carried for hours without showing any of the classical signs of exhaustion, in the character of the pulse and its rate, or in the character of the labor pains, and if operative delivery is indicated, either in the interests of the mother or child it may be accomplished with less shock and with less general anesthesia.

The conduct of labor in cardiac cases is favorably influenced by the administration of twilight. Apprehension, restlessness and physical pain are all ameliorated by the scopolamin, hence the strain of labor, which plays such havoc in hearts which are decompensated, may be greatly reduced by carrying the woman through the first stage of labor under twilight. In our service at the Long Island College Hospital we have employed morphine and scopolamin as a routine in our cardiac cases, whether compensated or decompensated, and by this plan have fortified the women's resources and obtained full dilatation of the cervix without putting strain upon the heart. The same may be said upon the conduct of labor in the presence of tuberculosis where the first stage may be successfully carried through under twilight.

The contraindications to its use are the emergency conditions which arise in obstetric practice, as: precipitate labor, placenta previa, accidental hemorrhage, eclampsia, prolapse of the cord, primary inertia, and a dead fetus. On the other hand, it may be used as a first-stage procedure to secure dilatation in malpositions, when such malposition is recognized, as it has been shown that the proper employment of scopolamin favors dilatation of the cervix and diminishes the spasticity of the uterus.

Two methods of administration have been introduced into this country, that of Siegel, who uses the drugs according to a definite schedule of doses, a method employed in third-class patients in Freiburg with fair results, and that of Gauss, who individualizes the patient, grading the doses by the condition of amnesia obtained. In this plan, a single dose of morphine hydrochloride is given instead of repeated doses. Until we adopted the latter method, many of our babies showed some cyanosis.

The drugs as used at Freiburg come in ampoules, each containing 1 c.c. of the solution, the strength of which is as follows: Each ampoule contains respectively scopolamin hydrobromide (Straub) 0.0003 gram (gr. 1/200), solution of narkophin, 0.03 gram. According to the Siegel method, they are administered as follows: When the labor is definitely established, 1½ ampoules of each drug is given hypodermically as the initial dose; forty-five minutes later, 1 ampoule of scopolamin is administered alone; while one hour later, ½ ampoule of each is given. The amnesia is maintained by repeating the scopolamin alone in ½-ampoule doses every two hours. It is seldom necessary to repeat the morphine solution, though it may be used every third time, at six-hour intervals, in a long labor. It is the morphine which has the effect on the child.

In the Gauss method an initial dose of morphine hydrochloride, gr. ⅛ to ⅙, with scopolamin hydrobromide (Straub) 0.0003 is used; the morphine is not repeated, but the scopolamin in doses of 0.0003 or 0.00015 gram is given at one-, two-, or four-hour intervals, depending on the degree of amnesia and the clinical picture presented by the patient. Each woman is individualized and carried along with the minimum dose. Smaller doses are required when the sleep is induced early in labor, larger doses when the first stage is well advanced before the initial dose is administered. It is in the latter class that there is most danger to the child, as the child gets the full effect of the drug.

In my personal experience and that of my associates, Drs. Ralph M. Beach and F. C. Holden, at the Long Island College, Jewish and the Methodist Hospitals in Brooklyn, 155 cases in all, there have been but three failures. One hundred and fifty had no recollection of their labor after the second injection, a few have had islands of memory, 10 per cent. have shown some delirium, during the perineal stage. There has been no fetal mortality. Hence, we must conclude that scopolamin-morphine anesthesia can be used without detriment to either mother or child in properly selected cases. There have been nine low forceps operations in this series, a low average considering that the majority of patients were primipara. So by its use we have diminished the number of operative deliveries and so lessened the amount of obstetric trauma. There has been no case of postpartum hemorrhage, hence we can say that the frequency of postpartum hemorrhage has not been increased, by the use of this method and that the women in whom it has been employed have been in better physical condition, especially after prolonged labor than the same class of patients under ordinary labor. Our observations also show that the milk supply has not been affected.

We are further impressed, as our experience increases, with the wide field of usefulness of scopolamin anesthesia in hospital obstetrics. We feel, however, that for the present, at least, it is a method for the expert in a maternity hospital, and that its greatest usefulness is as a first-stage procedure.

288 Clinton Avenue, Brooklyn.

"TWILIGHT SLEEP"

REPORT OF ONE THOUSAND CASES.*

BY

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There is probably no subject to-day which has demanded so much attention from both the medical profession and the laity as that of the so-called "Twilight Sleep," and my only excuse in bringing it before you is to give you a statistical report of 1000 cases collected in the United States.

Before going into the details of these cases I wish to give you a brief resumé of the technic of the method, its indications and contraindications, as well as advantages and disadvantages.

It is not the purpose of this paper to go into the details of all that is known about *Dämmerschlaf*, as that would consume many hours, but rather to give you a plain statement of facts in a condensed form.

Dr. Polak's definition is undoubtedly the best; "The application of partial narcosis to the most painful ordeal in a woman's life, in such

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*Read before the King's County Medical Society, January 19, 1915.

a way as to eliminate the memory of subjective pain without interfering with the uterine contractions."

This "twilight sleep" then, is merely an *amnesic state*, in which the patient seems to forget successive events in her labor, a short time, say one-half hour, after they have occurred. She seems to be conscious of events at the time they occur and remembers incidents of the immediately preceding ten or fifteen minutes, but each successive event will, in its turn, be forgotten and the memories are not stored in the higher brain centers. In other words she has perception but not apperception.

"Twilight state," as you all know, is induced by repeated hypodermic injections of morphine and scopolamine, in dosage sufficient to induce an amnesic state but not to interfere with the progress of labor.

Morphine and scopolamine have been used extensively in obstetrics and surgery for the past ten or twelve years in this country as well as abroad, but the bad and indifferent results which were at first obtained by the use of these drugs we now know to have been due entirely to overdosage and the use of impure and unstable preparations.

The combining of morphine and scopolamine each time a dose was given, had the effect in obstetric cases of causing prolonged labors, forceps deliveries, delirium, postportum hemorrhages and asphyxiated babies.

To-day, however, by following the modern technic of Gauss, by giving only *one dose of morphine*, by using a stable preparation of scopolamine and regulating the time and the amount of the dose to each individual patient, we have been able to eliminate most of the above difficulties and produce uniformly good results.

Briefly the technic is as follows. The patient must be definitely in labor, and if a primipara must have regular forcible pains at five-minute intervals with one to two fingers' dilatation, and thinning of the cervix. If a multipara, we may possibly start earlier, being sure, however, that she is actually in labor.

The patient is now isolated in a semidarkened, quiet room and all sources of external irritation removed, loud talking stopped as well as heavy walking about the room. It is advantageous to stuff the patient's ears with cotton and possibly place a towel over the eyes.

Right at this point I wish to emphasize the importance of the proper surroundings in inducing a twilight state. We admit that *Dämmerschlaf* may be induced in the broad daylight if we give enough of the drugs, but we then subject our patients to all the dangers enumerated above. However, if the surroundings are ideal, we may induce an amnesia with the minimum possible dosage, and we do not materially prolong labor nor cause the birth of asphyxiated babies.

The patient now receives an initial injection of morphine sulphate, gr. $\frac{1}{6}$ to $\frac{1}{8}$ and scopolabromine hydromide, gr. $\frac{1}{130}$. Water should be administered freely at this stage while food is not given at any time during the "twilight." At the end of one hour the patient receives scopolamine hydrobromide, gr. $\frac{1}{200}$. The immediate effect of the first dose is to diminish the subjective sense of pain and to create a partial drowsiness of the patient between the pains. The effect is still more marked after the second dose and the patient sleeps more soundly between the pains, arousing only when the uterine contraction takes place.

The face is always slightly flushed, and the patient may turn or roll in bed and show some external signs of pain. I wish to emphasize at this point the importance of *suggestion* to the patient, while she is going into the "twilight state." If we have an intelligent patient and sit by her bedside continuously for the first hour encouraging her not to cry with the pains but to keep perfectly quiet it is remarkable how quietly and quickly she will go into the "twilight state" and remain so throughout the entire procedure.

I have been particularly impressed with the lack of restlessness and delirium in this type of patient when so handled. The ignorant patient however who goes into the "twilight state," crying and screaming, will probably do this throughout her labor and get worse rather than better.

Going into the "twilight state" seems analogous to me to going under a general anesthesia. Here we talk to and encourage our patients and the same holds good for *Dämmerschlaf*.

The first two doses of the drugs as described above may be said to constitute an average schedule for all patients, but right now begins the task of individualization of each patient, and the memory tests play a leading rôle. One-half hour after the second dose the patient's memory is tested by asking her how many hypos she has had. If she does not remember the second hypo, she was in the "twilight state" at the time she received it and the amnesia is maintained by succeeding doses of scopolamine hydrobromide, gr. $\frac{1}{400}$, given at intervals of about one and one-half hours. If her memory was present at the time of the second injection she was not under and needs more scopolamine, the average dose being perhaps gr. $\frac{1}{300}$ one hour after the second injection.

When the patient is once in the "twilight state" she is kept so with repeated doses of scopolamine gr. 1/400 at intervals averaging about one and one-half hours. Morphine is only very rarely repeated in a 1/12-grain dose if the patient becomes restless, and this drug is best not given within two hours of the actual birth.

While the above may be given as a working basis for "twilight" it must be emphatically stated, however, that individualization is the keynote to success and the memory test is after all the *crux of the situation*.

If we do not make these memory tests at intervals, we are not *absolutely certain* that the patient is in an amnesic condition, and if we attempt to hold the patient too lightly under, she will have so-called "isles of memory," and remember certain incidents after the labor is complete.

If our patient has too many of these isles of memory she may be able to practically "frame up," so to speak, her entire labor, and our twilight is not a success. The abolition of all external evidence of pain on the part of the patient, is absolute proof that the patient is too deeply under and when this state is maintained throughout her labor, the result is an asphyxiated baby. If, however, she is kept lightly under and shows some external evidence of pain, the babies are born in normal condition.

We have seen numerous patients who were in the "twilight state," go from three to four hours without an injection and still be perfectly amnesic, while the next patient may need a repetition of medication every hour to hour and a half. This is merely to emphasize the varying susceptibility of different patients to the drugs and any one contemplating the use of "twilight sleep" should see a series of cases before employing it, in order to familiarize himself with its varied phases.

Our patient now progresses in her labor, arousing with and sleeping between her pains until she is delivered. The progress of labor is determined by rectal or infrequent vaginal examinations and the perineum must be watched carefully during the second stage of labor as babies may be born without the knowledge of the accoucher. As soon as the patient is in the second stage of labor a tight abdominal binder is applied and the patient encouraged to bear down, her hands are grasped and she is told to make traction as in the ordinary labor case. If our patient is in a real "twilight state" she will do all of these things, obey all of the doctor's orders, and yet have no recollection of these events afterward.

The actual delivery is best accomplished by having a nurse hold either thigh flexed upon the abdomen with feet raised from the bed. Most patients are rather restless at this time as in their amnesic state they do not realize what is going on . A small amount of chloroform or ethyl chloride is best given during the actual delivery as the severe pain at this time may bring the patient from her "twilight state."

After the completion of labor the woman should be kept in a darkened room and allowed to sleep as long as possible until she wakens naturally. This sleep is important as it obliterates from her memory the events of the birth of the baby and the third stage, completes the amnesia and allows her to recuperate from the exhaustion of the labor.

The baby's cord is clamped and cut immediately after birth and the child removed to another room. It is peculiar that the cry of the baby may awaken the patient from her amnesia and remain in her memory while the pain of the delivery some two or three minutes previous will not be remembered. The mucus is cleansed from the baby's mouth as soon as possible and the child placed in a warm blanket. A spontaneous or slightly delayed cry within the next few minutes is the rule or a moderate degree of oligopnea may develop. Real asphyxia is no more frequent than after the ordinary labor.

The actual condition of the baby at birth and the spontaneity of its first cry are determined by the skill with which you have produced the "twilight state," using the minimum possible dosage of the drugs, and also the length of time in the second stage. We must not forget that a certain number of all women are destined to need a forceps delivery, "twilight" or no "twilight" and it is poor judgment to wait indefinitely in these cases for a spontaneous labor, to the detriment of the baby. We must control the fetal heart every half hour in the first stage and every fifteen minutes in the second stage of labors and must interfere upon the first signs of danger to the baby as we do in any ordinary labor.

Indications and Contraindications.—Granted then that the production of *Dämmerschlaf* is an actual scientific procedure, what are the indications for its application?

I believe that the method may be used in any case of labor except under the conditions which will be described as contraindications. It is especially suitable in the long painful first-stage labors where the dilatation is progressing slowly in spite of good strong uterine contractions, and in the *neurotic woman* who is *mentally* and *psychically unfit* to go through the ordeal of labor. The physically unfit woman is different from the above class and generally has some degree of uterine inertia and should not be subjected to the method.

As contraindications to the use of "twilight" we may mention the following:

1. *Primary uterine inertia* is an absolute contraindication to beginning "twilight." If the patient is having irregular pains at intervals of ten, fifteen or twenty minutes, these contractions being poor, the method should not be used. We may, however, wait in such a case until the uterine contractions are definitely strong and regular, then use the method.

2. Marked pelvic contractions are a definite contraindication, as some operative procedure will be necessary. Cases of border line pelvic contraction may, however, be given "twilight," to procure dilatation of the cervix and give the patient a test of labor.

3. Hemorrhages either from placenta previa, or accidental hemorrhages are contraindications.

4. A dying or dead baby should be a contraindication, not from a medical standpoint, but because the patient if ignorant, will lay the stillbirth to the method employed.

5. The emergencies of labor such as eclampsia, prolapsed cord, prolapsed arm, transverse presentation with ruptured membranes, etc., are all contraindications, as they are conditions which will demand some operative interference.

ADVANTAGES OF THE METHOD.

The advantages of the method may be briefly stated as follows:

First. The patient has practically a painless labor in about 85 per cent. of all cases. In a certain small percentage of cases there will be no effect from the drugs and in just these cases it is important not to push the dosage to get an effect, as this will result only in asphyxiated babies. Have, what you consider a maximum schedule and do not exceed this.

Second. The patient does not have the subsequent nerve exhaustion that comes after a prolonged labor, she awakens refreshed after the amnesia, and her picture both physical and mental on the second, third or fourth day is entirely different from the ordinary case. She feels better, stronger, wants to get out of bed and does not have any of the so-called shock of the confinement. This seems to me to be one of the great advantages of the "twilight method." The Freiberg statistics show an actual diminution in the occurrence of postpartum psychosis and insanity, and these results must be ascribed to the lack of exhaustion of the patient's higher brain centers.

Third. The milk secretions seem to be better, as we will attempt to show in our statistics.

Fourth. We have fewer cervical lacerations. This is due to three factors, the cervix is softened and its dilatation is aided by the drugs, the delivery of the baby through the cervix in both the normal and the "dry labor" case is not so precipitious, and lastly and most important we are not compelled to use forceps before dilatation is complete. Forceps through an undilatated cervix is fast becoming a thing of the past under the "twilight method."

Fifth. Diminution in the number of high and median forceps operations.

Sixth. Cardiac cases, even those with some break in compensation go through the ordeal of labor with a minimum of nervous apprehension, and with the expenditure of less muscular energy.

Seventh. Toxemic cases, even with increased blood pressure go through labor, with less likelihood of convulsions and the urinary output is not affected.

Eighth. We will have more babies and better babies, as the women of the better class will not fear the ordeal of a painful labor. The ignorant classes are the ones to-day who are raising the large families as they do not understand the prevention of conception.

DIFFICULTIES OF THE METHOD.

The main difficulty of the "*Dämmerschlaf*" as we see it to-day is the moderate prolongation of the second stage of labor in the primipara and it is a question whether this is *always a disadvantage.* Many primiparæ deliver too rapidly, causing submucous lacerations of the levator ani muscles, even before the head is born. Most observers seem to think that lacerations of the pelvic floor are less frequent by the "twilight" method.

Any undue prolongation of the second stage we are minimizing, as we learn more about the method, by attention to the following details. Making the patients bear down, the tight binder, flexion of the thighs on the abdomen and a *minimum dosage under the most ideal surroundings.* Pituitrin may be used if the head is through the pelvic outlet. Expressio fetus in the multipara and the median episiotomy of Pomeroy in the presence of a rigid perineum, are things that should not be forgotten.

Restlessness in the second stage is rather common, more so in the ignorant class where the method is started too late in labor. The intelligent woman who is started early in labor, who understands what we are trying to do and *gives her aid in going into the " twilight state,*" will rarely give you trouble. Delirium necessitating restraint, occurs but rarely and is generally due to hyoscine or an unstable preparation of scopolamine.

The preparation of "Scopolamine Stable" of La Roche gives the best results, according to reports returned to me.

ADVANTAGES TO THE BABY.

The baby mortality is lessened by the *Dämmerschlaf* as we will show in the statistics. This is probably due to the lack of high and medium forceps, and the close attention to the fetal heart during labor. In other words we are *training ourselves* to observe more closely the details of the labor and becoming better obstetricians.

STATISTICS.

The statistics which I am going to present were collected in the following manner.

About 400 letters were sent to members of the different obstetric societies, throughout the country, asking for details of their cases, drugs used, operative procedures, condition of the baby, etc.

To date I have reports of some 1300 or 1400 cases of *Dämmerschlaf* and have tabulated the first 1000 cases.

For the sake of comparison we have examined the records of 1000 cases of labor at the Jewish Hospital, Brooklyn, just before the use of "twilight."

In compiling the 1000 cases without "twilight" we have read over each history separately and eliminated all such cases as we would not have "twilighted," that is primary uterine inertia, placenta previa, accidental hemorrhage, cesarean section, eclampsia, prolapsed cord, etc., and attempted to make the study as unbiased as possible.

I want here to express my sincere appreciation to Dr. Irving Tran and Dr. Samuel Blum, assistants at the Hospital, for their painstaking and untiring efforts in compiling this latter series of cases, and also to our internes Drs. Kornfeld and Louria for their accurate records of the "twilight" patients. I am also indebted to Drs. Mathews and Mays at the Methodist Hospital, and Drs. Gilles and Bartley at the Long Island College Hospital for their aid in compiling these records.

We must remember that these 1000 cases of "twilight" represent the work of twenty-five different observers and not alone that, but the *first cases of these men with a new method.* With refinements of technic and more complete knowledge of details, their second thousand cases should give even better results.

TABLE I.

1000 *Cases of Labor.*

	Without	With Dämmerschlaf
Primigravidæ	39.2%	69.8%
Multigravidæ	60.8%	30.2%
Spontaneous labors		
Primiparæ	73.9%	78.36%
Multiparæ	86.1%	89.73%
Operative labors		
Primiparæ	26.1%	20.9%
Multiparæ	13.9%	10.27%

The first table represents the total number of cases that were examined. The most striking part of this comparison is the greater number of primiparæ in the "twilight" series. This shows that men throughout the country are using the method mainly with first births, the most difficult ones to begin with.

The number of spontaneous labors was increased both in primiparæ and multiparæ in the "twilight" series, while the operative labors were diminished.

TABLE II.

Forceps.

	Without D.	With D.
High and medium operations		
Primiparæ	11.73%	4.2 %
Multiparæ	4.11%	2.64%
Low operations		
Primiparæ	11.48%	15.18%
Multiparæ	4.11%	5.96%
All cases	14.1 %	16.2 %

This table represents the number of forceps deliveries which were performed, and in attempting to classify these I have divided them into high and median operations as compared with the low operations. High and median forceps are without doubt the most traumatic deliveries, responsible for the severe cervical and vaginal lacerations and the dead and mutilated babies. They are the operations which cause chronic invalidism in the woman and are responsible for most of the work of the gynecologist.

The most striking feature of this table is the marked diminution in these types of operations, a reduction from 11 per cent. to 4 per cent. in primiparæ and from 4 per cent. to 2 per cent. in multiparæ. In the low forceps we have an increase, and this is undoubtedly due to the fact that the woman under twilight does not bear down as well during the second stage as the woman who is wide awake. The total forceps were increased from 14 per cent. to 16 per cent.

This merely means an increase of 2 per cent., that is, in any given series of fifty cases we would have one more forceps in the "twilight" cases and this generally a nontraumatic low forceps.

TABLE III.

Maternal Statistics.

	Without D.	With D.
Mortality	1 death, suddenly on 10th day, postpartum.	0
Insanity	1 melancholia, 6th day, postpartum.	1 depressive melancholia.
Postpartum hemorrhage	17 cases, 1.7 per cent.	8 cases, 0.8 per cent.
Lacerations	Primiparæ 91.0 per cent. Multiparæ 18.4 per cent.	25.1 per cent. 3.28 per cent.
	Average 46.9 per cent.	14.2 per cent.
Delirium	+	Stable preparations, 11 cases in 546, 2 per cent.
		Hyoscine and scopolamine, 12 cases in 248, 4.8 per cent.

This table represents the maternal statistics. We had one death in the non-twilight series and no deaths among the twilight cases.

As Regards Insanity.—In the cases without twilight we had one case of severe melancholia, which developed on the sixth day postpartum. I am certain that we had other minor psychoses which were not noted in the histories. The mental state of our patients was not studied and observed so closely until we started the use of twilight. In the latter series we have report of one case of depressive melancholia.

Postpartum hemorrhage seems to have been diminished. I think the question of hemorrhage after delivery is entirely due to the manner in which the third stage is handled.

Lacerations seem to have been diminished. Postpartum lacerations in our twilight cases were 91 per cent. That seems a very large percentage, but I will say that in our records at the hospital if there is a nicked perineum, even a mucous abrasion necessitating a chromic suture it goes down as a laceration, and this makes a high percentage in primiparæ.

Delirium requiring restraint during the labor, occurred in from 2 per cent. to 4.8 per cent. of the cases, being less frequent if stable preparations of scopolamine were used.

TABLE IV.

Baby at Birth.

	Without D.	With D.
Spontaneous cry	78.6 per cent.	79.9 per cent.
Oligopnea	5.8 per cent.	14.6 per cent.
Induced cry	9.4 per cent.	
Asphyxia	3.6 per cent.	3.6 per cent.
Stillbirth	2.5 per cent.	1.9 per cent.
Babies Died within 15 days.		
	24	20
Stillbirths	25	19
Totals	49	39

This table represents the condition of the baby at birth. It will be noted that there were more cases of oligopnea among the twilight cases, but that, in general, the spontaneous cry was about the same in both series. It is a strange coincidence that the asphyxias were the same in both series.

There were twenty-five stillbirths in the non-twilight series as compared with nineteen in the twilight cases. When we study the number of babies dying during the puerperium we find also a percentage in favor of twilight. If we now total these two series we find that in 1000 cases without twilight forty-nine mothers went home without their babies, while in the twilight series there were only thirty-nine dead babies.

There must be a reason for this and it is certain to be explained in part by a lack of traumatic deliveries under the method of Dämmerschlaf, and also the fact that we are becoming better obstetricians and following the course of these labors more closely. The fact stands out, however, that the baby statistics are really better and this after all is the aim of modern obstetrics.

TABLE V.

Causes of Stillbirths.

Without twilight	25 cases
Dead before labor	5 cases
Craniotomies	6 cases
Cause not stated	14 cases
With twilight	19 cases
Dead before labor	4 cases
Craniotomy	1 case
Prematurity + eclampsia	1 case
Positive Wassermanns	2 cases
Transposition of viscera autopsy	1 case
Prolonged labor—Cerebral congestion autopsy	1 case
Prolonged labor	2 cases
Operative delivery—version	1 case
Cord about the neck	3 cases
Cord about the neck—forceps	2 cases
Lack of vitality	1 case
	19 cases

This table shows the cause of stillbirths as nearly as could be stated. There is a great tendency to-day if any twilight baby dies to ascribe the death to the drugs, and this is true not only among the laity but the profession as well.

This is absolutely wrong and I think these statistics prove my contention. We must make an earnest effort in all of these cases to procure autopsies and Wassermann reactions on the mother to determine the actual cause of death.

TABLE VI.

Babies Died in the Puerperium.

Without twilight	24 cases
Atalectasis (autopsy)	1 case
Polycystic kidneys (autopsy)	2 cases
Visceral hemorrhages (autopsy)	1 case
Myelo-meningocele (autopsy)	1 case
Patent foramen ovale (autopsy.)	1 case
Prematurity	2 cases
Operative delivery	4 cases
After spontaneous labor	12 cases
With twilight	20 cases
Bronchopneumonia	2 cases
One kidney, atalectasis (autopsy)	1 case
Spina bifida	1 case
Melena neonatorum	1 case
Cerebral congestion (autopsy)	1 case
Cerebral hemorrhage (one autopsy)	2 cases
Edema glottis	1 case

TABLE VI (*Continued*).

Patent foramen ovale (three autopsies)	3 cases
Prematurity	3 cases
Prematurity, * * * * * Wassermann	1 case
Syphilis	1 case
Operative delivery (forceps)	1 case
Malnutrition (autopsy)	1 case
Doubtful	1 case

This table represents the causes of fetal death during the puerperium.

Here again we find that there are many other causes of fetal death than twilight alone and we must not condemn the method unless we are sure of the autopsy findings. We had twelve babies die during the puerperium after spontaneous labors without Dämmerschlaf. These babies were unfortunately not autopsied. If there is any one thing which has stimulated us to procure postmortem examinations and determine the cause of death in these babies, it is the use of the Dämmerschlaf.

TABLE VII.

Critique of Twilight.

Amnesia, complete	73.5 per cent.
Amnesia, partial	12.5 per cent.
Analgesia	4.4 per cent.
Failures	9.4 per cent.
Total cases giving detail	876

Causes of Failures.

No effect of the drugs	37
Too rapid labor	42
Too "lightly under"	2
Case stopped due to inertia	1
Poor surroundings	1
	83

Discharge Weight of Baby.

Without Dämmerschlaf.

In 951 cases, 454 gained birth weight by day of discharge	47.6 per cent.

With Twilight.

In 47 cases, 30 gained	64.0 per cent.

This table represents the results of the twilight as regards amnesia, etc., in 876 cases, giving details.

These results are about what we would expect in such a series of cases. About 90 per cent. of all cases treated show some relief from their labor pains while 75 per cent. have a complete absence of memory of the events of labor. The percentage of failures 9.4 per cent. is too high.

An inspection of the causes of failure, shows that more than half of these cases, forty-two in number, were due to too rapid labor. These cases coming into the hospital, late in labor should not be given twilight as they do not have time to pass into the amnesic state before they are delivered. In my estimate these forty-two cases, the complete failures due to nonaction of the drugs, are reduced to about 5 per cent.

In the first forty-seven cases of twilight at the Jewish Hospital, Brooklyn, we kept an accurate weight chart of the baby and found that thirty out of the series of forty-seven cases had gained their birth weight on the eleventh day a percentage of 64 per cent. In our previous 1000 cases, we found that only 47 per cent. got to their birth weight by the day of discharge.

This would seem to show that the twilight mothers are in better physical and mental condition after delivery and better able to nurse their babies.

CONCLUSIONS.

From this study of the "Dämmerschlaf," I think we may draw the following conclusions:

First. That "twilight sleep" is a reality and not a fad.

Second. That by its application, we may give about 85 per cent. of cases in which it is used, a practically painless labor.

Third. That it is contraindicated in certain definite cases, especially in primary uterine inertia, markedly contracted pelvis and the emergencies of labor which demand operative interference.

Fourth. That it may be used in all other labors and is especially applicable to the nervous woman, the psychically unfit woman, in long painful first-stage labors, in cardiac cases, etc.

Fifth. That the women after twilight labors are in better condition because there are less difficult forceps, less lacerations of the cervix and perineum, better milk secretion and less nerve exhaustion. They recuperate much faster than by the old method.

Sixth. That it does not cause insanity as stated in the lay press but rather tends to diminish its occurrence.

Seventh. That we will have *more* and *better* babies.

Eighth. That its disadvantages are slight and we are learning to overcome them by a further knowledge of the method, a closer attention to detail and perfection of technic.

Lastly. That "twilight sleep" is a method which, to get the best results, must be performed under ideal surroundings, with the minimum possible dosage and by some one who has trained himself to do the work.

We do not claim that "twilight sleep" will be a panacea for all women in labor as the treatment is essentially a hospital one except among the wealthy who can afford the assistants necessary.

The great bulk of people of the middle class, will still be delivered at their homes by the family physician. However, under the proper surroundings and given intelligently, "twilight sleep" is a scientific reality and will become used more and more as a part of the armamentarium of the expert obstetrician.

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THE USE AND ABUSE OF PITUITRIN IN OBSTETRICS.

BY
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Pituitrin was first used in obstetric practice five years ago, and its rapid acceptance throughout the obstetric world attests its merits. The work of the brain surgeons has stimulated the physiological chemist's investigations of the pituitary body, and while there is some definite knowledge of its physiology, its apparent influence upon metabolism and growth is not understood and its physiological relation to other ductless glands and to the functions of special organs and systems of the body are yet matters of speculation. Experimental studies of the effects of extracts of the posterior lobe when injected into human beings and the lower animals seem to prove that blood pressure is raised from 20 to 40 m.m. of mercury for a half hour or more; that gradual diminution of respiratory movement to the point of cessation is soon followed by gradual return of respirations; and that unstriped muscle tissue, wherever found, is sensitized and stimulated. This latter effect is noted upon the heart, the intestines, the bladder, and especially upon the uterus. Whether the diuresis noted results from direct action upon the kidney cells or from its circulatory effects is not known. The pituitary gland, like all the ductless glands, offers a most interesting field for the experimental physiologist. Our problem, however, is a practical consideration of the use of this newly found agent in obstetric practice. Reports of this use of pituitrin are rapidly accumulating and its selection for your discussion to-night is for the purpose of learning your experiences and thus to more clearly define its limitations and possible dangers, as well as its usefulness. Culled from the numerous reports we find the following disagreeable or dangerous results following the injections of pituitrin—nausea, vomiting, vertigo, and tinnitus, more frequently observed in weak anemic patients; more serious results have been collapse, uterine atony and hemorrhage, contraction of the cervix, tetanus uteri, ruptures of the uterus, unnecessary lacerations of the cervix and vagina, premature detachment of the placenta, asphyxia of the infant sometimes fatal. Its inefficiency in treating or inducing abortion is generally noted, and in the treatment of incomplete abortion, even with a dilated os, it is not believed to be as efficient as ergot. Used alone for the induction of labor prior to or at term it has failed to demonstrate any real value, in large numbers of cases, especially in primiparæ. When uterine contractions have been instituted by other means its action then appears. This action is almost nil in the first half of pregnancy, and progressively increases until its greater efficiency is manifested in the second and third stages of labor. It is said to sensitize the uterine muscle to its normal stimuli, rather than actually to induce contractions.

After an injection the intervals between contractions are lessened, the first pains areo ften prolonged, and may be tumultuous in character, with the attendant dangers to the mother and child. The innumerable reports of rapidly and safely terminated labors constitute the real danger of the obstetric use of pituitrin at the present time. Reports of accidents following its injudicious use are growing more frequent. Widespread discussion of the limitations of its use, and a clear understanding of the class of cases in which it may safely be used are in order. That it has a place in obstetrics and has come to stay is certainly the experience of every one who has had a wide experience with it, tempered with and guided by good obstetric judgment.

Pituitrin's Safety Zone in Obstetrics.—As far as our knowledge and experience has taught us, the ideal safety zone would include the following class of cases. Multiparæ, with histories of previous normal labors in whom there are no serious cardiac, cardiovascular or nephritic degenerative changes; the second stage of labor has begun; the presentation and mechanism are normal; the bag of waters is unruptured; the vaginal canal relaxed. One intramuscular injection of 1 c.c. of pituitrin will, in such a case, usually, in almost magic manner, end the labor within the hour. For the sudden and violent pains induced, ether analgesia is always employed, and to forestall the real danger of uterine relaxation within an hour after delivery, a hypodermatic injection of aseptic ergot is always to be given immediately after the birth of the child. It has been repeatedly stated that pituitrin is always contraindicated when labor is progressing normally, but for the particular class of cases just described, I believe its use is justified, even with a normally progressing labor, for the avowed purpose of shortening the hours of suffering to a very few minutes. During those minutes ether administered to the degree of producing temporary unconciousness at each recurring pain will produce amnesia, prevent nerve exhaustion, and relieve pain. This method for multiparæ, some of my patients have designated the "afternoon" or "midday jag," which they say and I believe is far superior to "twilight sleep." The only inconvenience observed from this method is an occasional increase in after-pains, the inconvenience of which the patient endures when such pains are explained as "blessings in disguise" to prevent undue bleeding and promote involution. Codeine or morphia in small repeated doses throughout a day will relieve these after-pains if extreme.

Pituitrin's Danger Zone in Obstetrics.—The danger zone of pituitrin in obstetric practice must be approached with more circumspection and requires more detailed study. The gravidity of the patient, the condition of the uterine muscle, especially of its lower segment and of the cervix and the vagina; the history of prior Cesarean section; the presentation and position (whether face, brow, shoulder, twins, breech, arrested posterior position) and a study of the mechanism and its progress; the size and shape of the pelvis; the presence of tumor or placenta previa, hydrocephalus or monster; knowledge of the patients general condition that would be jeopardized by a rise, even for a short period, of her blood pressure, such as toxemia, myocarditis, arteriosclerosis or grave nephritis—all these factors in obstetric diagnosis, should be known and appreciated and may render the use of pituitrin a highly dangerous addition to the careless or fearless obstetrician's equipment. Some of the conditions just enumerated occupy border-line positions of danger and deservedly require further discussion. For examples—the full or half initial dose to primiparæ; the desirability of using pituitrin in preference to forceps in posterior positions, or when there is minor degree of pelvic disproportion, to insure moulding and adaptation before difficult forceps deliveries; its use in certain types of placenta previa, and even in eclampsia.

The most serious contraindications, to my mind are mechanical obstacle to labor and an undilated and unyielding cervix. For the former the slow adaptation and moulding under nature's unaided guidance provides safety not to be obtained by the sometimes and unexpected violent and tumultuous action of pituitrin. While it is true that the mechanical dilator has taught us that the danger of lacerating a cervix is greatest when the dilatation is at the last stages, pituitrin in the earlier stages finds a mechanical obstacle in the cervix and its greatest danger then is to the child and the placenta. It has been my practice never to give more than half-doses to primiparæ prior to complete dilatation of the cervix and when moderate disproportion exists the slow skilled use of forceps is preferred. It has been claimed that pituitrin, by reducing the frequency of forceps deliveries, has won a triumph in thus avoiding shock, injury to the child's head, and serious injuries to the soft tissues; by diminishing the risk of infections and saving hours of suffering. In difficult forceps, its preliminary use has rendered the operation easier through better adaptation and engagement of the head. These arguments hold good for multiparæ, and for primiparæ after satisfactory dilatation of the birth canal, in whom inertia has developed and the indications for forceps are present. The same obstetric judgment required for the timely forceps delivery will often choose pituitrin with advantage to the patient. The glamour of pituitrin, however, should not make us act too soon. Let us always remember that in the group of cases with slight mechanical obstacle *uterine inertia* is the indication for pituitrin as it is for forceps. To correct abnormal mechanisms, the value of vigorous uterine action is well known and pituitrin again finds a valuable field in posterior positions of the occiput delayed at the inlet or to assist anterior rotation of the occiput or face. The inertia of breech or twin labors or when there is hydramnios furnish other important uses for this agent. Its value in placenta previa after bag insertion or version is unquestioned, and its careful use in half doses after the bougie has evoked pains in induced labors has certainly been of advantage in my experience. A very large proportion of multiparæ at term can be safely thrown into active labor by manual dilatation of the cervix to incite pains which will persist and grow stronger rapidly under a full dose of pituitrin. After the effect of this dose has worn away, in one to three hours, the cervix is fully opened and a second dose will rapidly terminate the labor. For the control of postpartum bleeding and to promote uterine contraction during Cesarean section my experience has taught me not to rely upon it alone but to always combine it with ergot, for I have had several experiences that make me believe the dose of pituitrin, while acting much more quickly than ergot, loses its effect more promptly and gives one a false sense of security that sometimes offers a rude awakening when the ergot is omitted.

The possible dangers of administering pituitrin, when grave structural changes in important organs have resulted from such diseases as myocarditis, arterial sclerosis, chronic nephritis, and profound toxemia with or without eclampsia, have not been definitely determined by experience. Until out knowledge is greater these diseases had better be classed in the danger zone.

Effects upon the Infant.—Slowing of the fetal pulse is observed, after the mother has exhibited the signs of absorption of pituitrin. Before the effects upon the mother have begun to wane, the fetal heart-beat resumes its normal rhythm. At birth, the infant is sometimes pale, and there may be evidences of meconium discharges. These effects, probably due to the effect of the drug upon the cutaneous circulation and upon the muscular coat of the intestines, are more likely to appear when the dosage has been excessive, either in size or frequency. In my experience they have not been observed when the total dosage has not exceeded 2 c.c. and the interval between doses has not been less than two hours. The relation between fetal asphyxia and violent and prolonged action and overdosage with pituitrin is one to be borne in mind. I have credited my experience of freedom from asphyxia to the facts of careful dosage and the invariable use of ether with the onset of vigorous, prolonged contractions. Ether apparently checks the tumultuous character of the contractions and at the same time relieves the extreme suffering.

The danger of detachment of the placenta, following violent and prolonged uterine contractions, in the earlier stages of labor must be a real danger, such cases have been reported.

Dosage.—The efficiency of the various preparations seems to be increasing with proper standardization. Pituitrin in 1-c.c. ampoules has with very few exceptions been efficient. It should not be used after the date specified on the container.

The tumultuous action sometimes observed from a full dose, whether due to the patient's susceptibility or to failure in standardizing the particular dose, has made the use of a full initial dose in primiparæ infrequent in my hands. The first dose usually shows more marked effect upon the uterus as it does upon blood pressure, unless there is an interval of three or more hours between doses.

If pituitrin were dispensed in doses equivalent to half the present dose, its usefulness would not be diminished; its dangers would be lessened.

An analysis of 106 cases in private practice offers the following facts:

(*a*) Primiparæ, 40 per cent. of the cases; multiparæ, 60 per cent. of the cases.

(*b*) Administered in the first stage, 40 per cent.; second stage, 34 per cent.; first and second stages, 26 per cent.

(*c*) DOSE.—Before dilatation of cervix, never more than ½ c.c. to primiparæ. After dilatation the dose was occasionally 1 c.c. To multiparæ with yielding or fully dilated cervices, the dose was always 1 c.c. The maximum dose to any case was 3½ c.c. in four doses.

(*d*) RELATION TO FORCEPS.—Thirty per cent. of all cases to which pituitrin was administered, were delivered with forceps, *i.e.*, it was successful in 70 per cent. of the forceps deliveries; 85 per cent. were in primiparæ; 15 per cent. in multiparæ.

(*e*) DURATION OF LABOR AFTER ADMINISTRATION OF PITUITRIN.—In multiparæ, when the drug proved efficient, delivery occurred within an average time of one hour and eight minutes; in primiparæ three hours and eighteen minutes, after the last dose. In 70 per cent. of primiparæ who had received from one to four doses (sometimes half-doses, always full doses after the cervix was dilated), the forceps was required to end the labor. This study verifies the experience of others that the first dose very often is the most efficient, and that the value of pituitrin is greater in multiparæ.

(*f*) ITS VALUE TO FORTIFY THE PAINS OF INDUCED LABOR.—*Primiparæ*, labor induced with the rectal tube.—After the pains had begun the action of pituitrin seldom failed to hasten the onset of active labor. *Multiparæ*, at term, after castor oil (℥ii) and manual dilatation and gentle separation of the lower pole of the sac.—The dilatation was kept up intermittently for ten to thirty minutes, until pains were thereby regularly brought on. Pituitrin assisted by dilatation, promptly brings on labor and often speedily ends labor within an average of three or four hours, following a single dose. A repeated dose, after an hour or two, will then rapidly end the labor.

Relation to Lacerations.—Labor in multiparæ, the final stage being conducted under ether and with counter pressure upon the head to resist precipitate delivery through the vulvar ring, has not been followed by a greater proportion of lacerations than is usual without pituitrin. In primiparæ, having avoided full doses, the increased number of lacerations that are said to occur were not observed.

Hemorrhage.—Four cases of free bleeding were noted: one of alarming hemorrhage required packings, and in one case of Cesarean section its use without the association of ergot caused collapse from hemorrhage, requiring intravenous transfusion of salt solution.

Ergot should always be used to reinforce the action of pituitrin to prevent and control hemorrhage.

Asphyxia.—In none of the cases was gross asphyxia noted. None of the infants perished. There was no material mortality.

From these experiences the following pituitrin aphorisms are drawn:

1. Never use pituitrin without exhausting your abilities in obstetric diagnosis.
2. Healthy multiparæ with relaxed birth canals offer the widest and safest fields for its use.
3. For inertia in the early stage of labor, the sleep of morphia, chloral, or scopolamin is preferred; in the advanced stages of labor, pituitrin often will wisely keep your forceps innocuous.
4. Ether hilarity and a quick pituitrin labor in multiparæ is a good practical substitute for "twilight sleep."
5. The uterus, after pituitrin's tumultuous visitation, usually needs the steadying hand of ergot.
6. Half-doses are more often to be employed than full doses.

500 North Twentieth Street.

AN IMPROVED METHOD OF CLOSING THE ABDOMINAL INCISION.*

BY

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(With six illustrations.)

The principles of the two methods in general use for closure of the abdominal incision are, first, approximation of all layers of the abdominal wall with interrupted sutures of silk or silkworm gut, without regard to accurate apposition of the structure of one side of the incision to the corresponding structure of the other side; second, the layer suture, in which each layer of the abdominal wall is closed separately, the deep tissues with continuous or interrupted sutures of catgut and the skin with various suture materials. A third method combines some of the features of the other two, interrupted silkworm-gut sutures through all structures down to the peritoneum and separate continuous catgut sutures in the peritoneum and deep fascia.

The advantages of the first method are the rapidity of its application, the certainty in sterilization of the suture material, the absence

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* Read before the Philadelphia Obstetrical Society, Dec. 10, 1914.

of any foreign substance to be absorbed and the security against reopening of the wound during severe and prolonged vomiting and coughing.

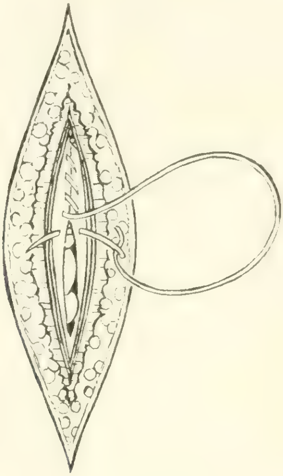

FIG. 1.—Continuous catgut suture of peritoneum.

The objections to the method are the impossibility of bringing into accurate apposition the respective layers of the abdominal wall, resulting in a weakened ventrum and the likelihood of incisional hernia; cutting of the skin by the suture, producing an unsightly

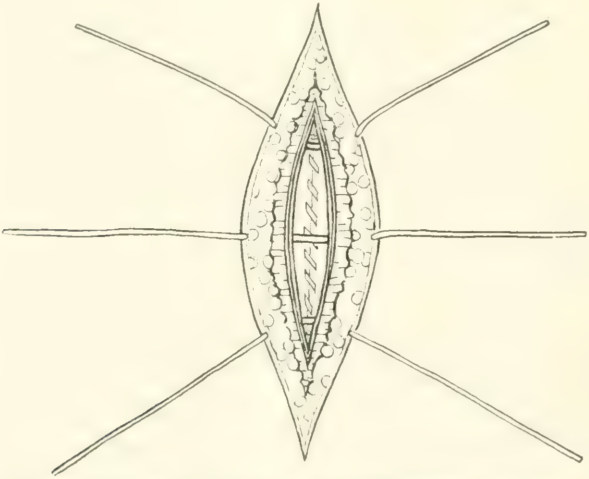

FIG. 2.—Method of introducing the silkworm-gut sutures.

scar; conveyance of infection from the skin surface into the deeper tissues along the course of the sutures.

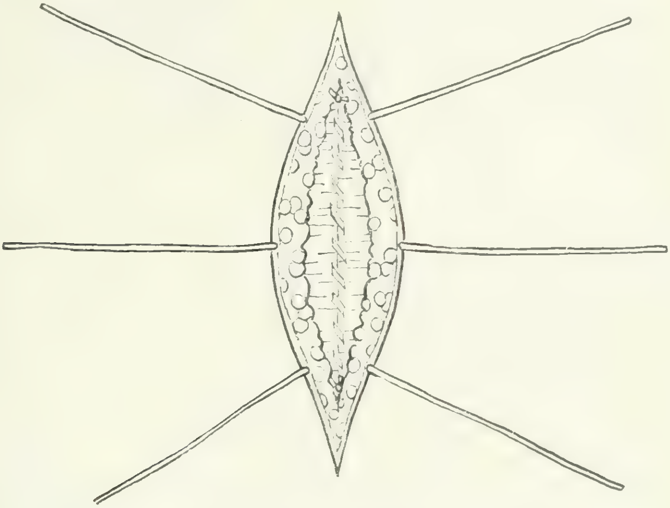

FIG. 3.—Continuous catgut suture in the deep fascia.

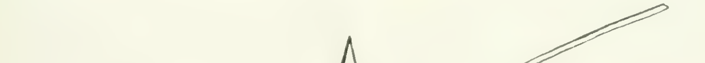

FIG. 4.—Subcuticular suture of cat.

The disadvantages of the first method are corrected by the layer suture, but in the use of the latter alone other difficulties arise. Its employment in any but a thin abdominal wall requires five layers of sutures, four beneath the skin. Since catgut is usually employed the possibility of infection is multiplied with each additional suture. Should infection occur in the deep tissues the catgut is not as effective in holding the edges in contact as is silkworm gut. Even in the absence of infection, it occasionally happens that violent coughing or vomiting will result in reopening of the wound and the escape of abdominal contents. Again, oozing hemorrhage from a lacerated rectus muscle is not as effectively secured by a suture which simply grasps its edge as by a suture which compresses it at a greater distance from its edge as does the through-and-through suture.

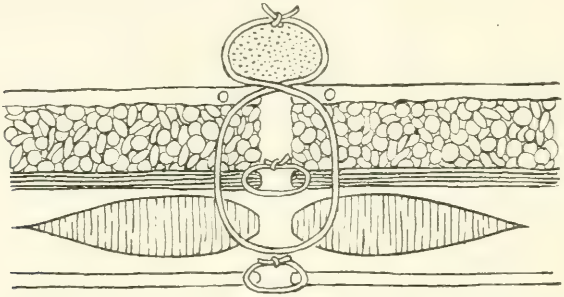
FIG. 5.—Cross-section through line of incision, showing 'position of each suture and crossing of the ends of the silkworm-gut before being tied over the gauze.

The third method combines accurate apposition of the principal layers of the abdominal wall (peritoneum and deep fascia) with the splinting influence of the interrupted, through-and-through suture.

I have recently employed a modification of this method, in which cutting of the skin and the introduction of infection from the cutaneous surface by the silkworm-gut sutures is avoided. It is performed as follows. The peritoneum is closed with a continuous suture of plain catgut (Fig. 1).

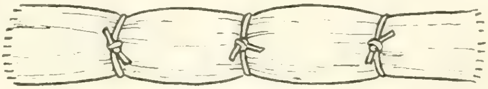
FIG. 6.—Sutures tied over gauze.

The silkworm-gut sutures are then introduced about 1 inch apart at the edge of the incision just beneath the skin surface and include all of the layers of the abdominal wall except the peritoneum (Fig. 2). The point of emergence of the suture on one side of the incision must be exactly opposite the point of entrance on the other.

Each end of the suture is temporarily held in a hemostatic forceps. The deep fascia or aponeurosis is closed with a chromic-catgut suture, continuous or interrupted (Fig. 3). The edges may be made to overlap if desired.

The skin edges are apposed by a subcuticular stitch of plain catgut (Fig. 4).

The ends of the silkworm-gut sutures are then crossed and tied over a strip of iodoform gauze (Figs. 5 and 6).

1642 PINE STREET.

AN IMPROVED METHOD OF SUTURING THE FLAPS IN AMPUTATION OF THE CERVIX.*

BY

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Philadelphia.

(With three illustrations.)

THE methods of suturing the flaps after amputation of the cervix heretofore employed have on numerous occasions left the repaired cervix in an uneven and scalloped state. The failure to produce a perfect cosmetic result may be attributed to several factors: (*a*) too much tension upon the edges of the flaps at the points of application of the sutures, resulting either in cutting, sloughing or atrophy of the tissue included in the suture; (*b*) gaping of the edges of the flaps between the sutures; (*c*) overlapping of the flaps, usually bringing the raw surface of the outer one in contact with the mucous membrane of the inner. Since these surfaces will not unite, the overlapping edge must either slough or shrink before it can be covered with epithelium in the process of healing.

In order to overcome these several difficulties the following method of suture has been devised and employed with gratifying results. It is particularly applied to the single flap and circular amputations and the operation of trachelloplasty described by Bonney, but may also be employed in the double flap amputation. The advantages claimed for it are the accurate approximation of the edges of the flaps with a minimum degree of tension upon the sutures.

In suturing the flaps after a single flap amputation or trachelloplasty proceed as follows: a chromic catgut suture, which we will designate the traction suture, is armed at each end with a well-

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* Read before the meeting of the Philadelphia Obstetrical Society, Dec. 10, 1914.

curved needle. Each needle is passed through the flap about one-quarter of an inch (6 mm.) from its edge; the points of introduction are on the raw surface of the flap one-eighth of an inch (3 mm.) on each side of the median line and the points of emergence are on the vaginal or outer surface of the flap. Both needles are then introduced through the base of the flap at the junction of the raw surface and the mucous membrane of the cervical canal. They are passed through the entire thickness of the lip of the cervix and made to emerge upon the vaginal surface about three-quarters of an inch (18 mm.) above the edge of the flap and one-quarter of an inch (6 mm.) apart (Fig. 1). After sufficient traction has been applied to the ends of the suture to invert the flap and bring its edge and base into accurate apposition (avoiding unnecessary tension) the ends of the suture are tied to each other. The other lip is sutured in the same manner.

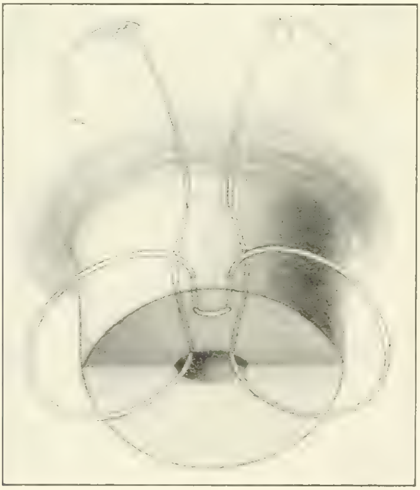

FIG. 1.—Method of introducing the traction suture in the anterior lip of the cervix.

The two lips of the cervix, which have been separated by the amputation, are drawn together by a mattress suture placed in each side of the cervix about one-quarter of an inch (3 mm.) external to the canal (Fig. 2). This suture begins in the vaginal surface of the anterior lip about one-half of an inch (1 cm.) above the edge of the flap and emerges upon the raw surface of the flap near its base; it is then passed through the lower lip from the raw to the vaginal surface.

In a like manner it is passed back through both lips on a line one-quarter of an inch (6 mm.) external to the first one. When the two ends of this suture are tied to each other the tension should be sufficient to insure hemostasis and approximation of the edges of the lips. These edges are then held in accurate apposition by interrupted sutures which should be superficially placed and firmly, but not tightly tied (Fig. 3).

Care should be exercised to avoid injury to the bladder by the suture which pierces the entire thickness of the anterior lip of the cervix.

It should be noted in this operation that the tension upon the edges of the flaps has been reduced to a minimum. This is accomplished in two ways: first, by the method of introducing the traction suture and, second, by the mattress sutures in the angles of the amputation. This reduction in tension avoids cutting by the sutures, sloughing and eversion of the edges of the flaps. Overlapping of the edges of the flaps is prevented by introducing the traction suture through the base of the flap at the junction of the raw surface and mucous membrane of the cervical canal.

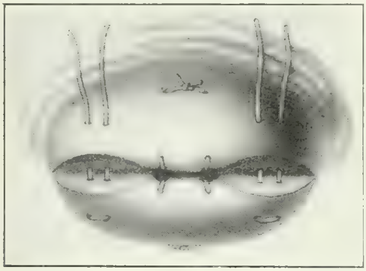

FIG. 2.—Method of introducing the mattress sutures.

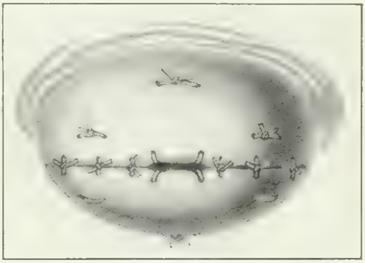

FIG. 3.—Method of introducing the superficial sutures.

1642 PINE STREET.

TRANSFUSION BY THE SYRINGE METHOD.*†

BY

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Philadelphia, Pa.

(With two illustrations.)

Since the resurrection of transfusion by Dr. George Crile, the technic has been simplified and modified until we now employ the above procedure. The first method employed consisted in connecting the lumen of an artery to the lumen of a vein by suturing the cut edges together and this was modified by substituting one of the many instruments for the suture in connecting them together, such as the cuffing cannula of Crile, Elsberg's instruments, etc., or by the interposition of a cannula, such as Brewer's glass tubes or Bernheim's metal tubes, these being coated by paraffin, or vaseline. Dr. Dorrance and Dr. Ginsburg next advocated connecting a vein to a vein instead of a vein to an artery for the following reasons. First, it is easier; second, less injury to structures; third, it more nearly follows the laws of the body.

The connection can be made by one of the above-described methods. The syringe method has been reintroduced by Cooley, Edwards, Lindeman and others. During the past seven years, I have used practically all of the methods and now use the syringe method which has the following advantages. First, there is no chance for carrying infection from the infected recipient to the healthy donor. Second, one is sure that the procedure is successful. Undoubtedly many of the failures laid to the door of transfusion are due to no blood passing the connection. Third, known quantity of blood transfused. Fourth, the technic is easy enough for any physician to perform. In working with blood or blood-vessels, the method must be simple and so arranged that if clotting occurs in one part the syringe can easily be removed and another substituted. A complicated apparatus is usually not satisfactory.

The instruments required are as follows: All glass syringes, four

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* Read before the Philadelphia Obstetrical Society, Dec. 10, 1914.

† Reported from Surgical Dept., St. Agnes Hospital.

of 50 c.c. each, two of 100 c.c. each, two small and two large cannulas with round-pointed trocar, and two sets of the usual instruments for venesection.

To avoid accidents, this operation should be considered a major one and performed, if possible, in a hospital operating room. The positions of the patients, operator, assistants and nurses are important and make the greatest difference in ease of operating. The arrangement most satisfactory is as follows: Two operating-tables of equal height placed parallel (Diagram I), about 3 feet apart. An instrument table of the same height as the operating-tables placed between the operating-tables. The donor is placed on table No. 1 with his left arm extended on table No. 3; the recipient on table No. 2 with his right arm on table No. 3. The operator stands to the left of the donor's head at No. 4, the assistant to the left of the recipient's abdomen at No. 5. The operating nurse to the left of the recipient's head at No. 6 with her table with the instruments and solutions back of her at No. 7. A second assistant may be placed opposite the opera-

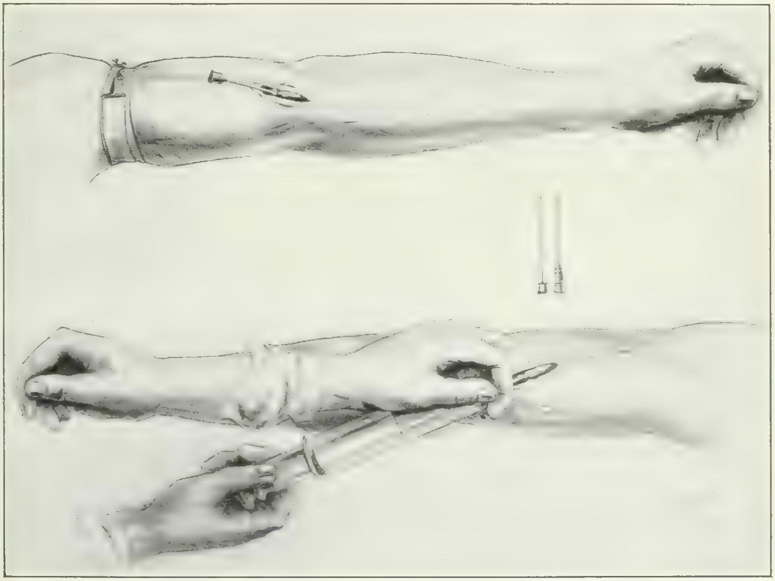

FIG. 1.

tor to assist with the cannula. A second sterile nurse to wait upon the operating nurse is essential. One person to manage the tourniquet on the donor is necessary and should stand to the right side of the donor and reach over the patient in attending to the tourniquet. The operation is performed by Dr. Lindeman without exposing the vein by introducing a special trocar and cannula into the vein through the skin. This is frequently possible but in the untrained and frequently in the trained, the needle will not be satisfactorily introduced. Too much hit or miss has already been used in this operation. It seems a surer, safer, and better surgical technic to expose the vein under local anesthesia. The nurse requires on her table besides two sets of venesection instruments, ligatures, sutures, needles, a local anesthesia set, three basins of

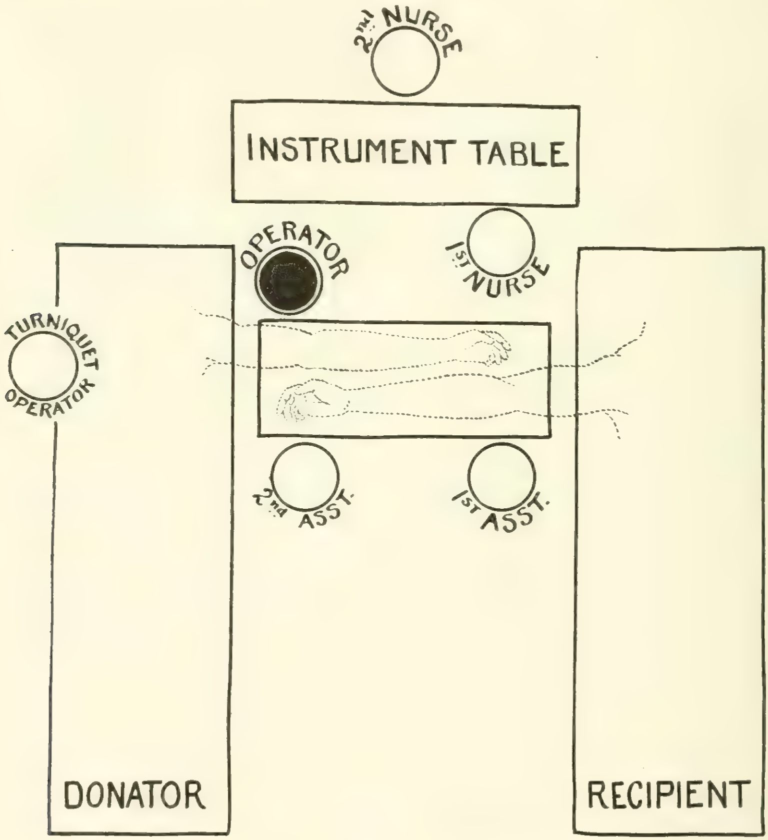

Fig. 2.

fresh sterilized salt solution at a temperature of 100 to 105° which should be changed by the second nurse as soon as the solution becomes dirty from cleansing the syringe, one small basin of sterile warm melted vaseline for lubrication of trocars and syringes. This is best kept in a basin of hot water. Sterile oil may be used in place of vaseline if desired. The nurse places the cannula in the vaseline and introduces the trocar several times to be sure the interior is well covered and the excess is then wiped off. Next the syringes are lubricated by drawing in some vaseline and pulling the plunger up and down until the interior is well lubricated and the excess is then expressed. The syringe is filled and emptied several times with warm salt solution to wash out the excess of vaseline. The operation is best explained by describing the steps as they are actually performed (Diagram 2). The donor and recipient are placed on tables 1 and 2 respectively. The operator and assistants take their places as previously assigned to them. A rubber tourniquet is now applied to the left arm of the donor, the median cephalic vein is exposed by an incision over and parallel with the vein and a ligature is placed beneath. A vaseline-coated trocar and cannula is pushed into the vein with the point toward the fingers and the ligature tied around the cannula. The assistant, at the same time exposes the median cephalic in the recipient and introduces the trocar and cannula into the vein, the point this time being toward the heart. He then removes the trocar and introduces by means of one of the syringes a small amount of warm salt solution to see if the recipient's venous channel is clear. If so, the trocar is reintroduced. The tourniquet on the donor's arm is now tightened sufficiently to distend the vein but not sufficient to obstruct the arterial flow. The nurse now fills a 50-c.c. syringe with fresh warm salt solution and expresses all the air and salt solution excepting 10 c.c. and hands it to the operator who then extracts the trocar from the donor's cannula and introduces the tip of the syringe in the cannula losing some salt solution in the procedure, and gradually pulls on the plunger with the right hand at the same time keeping the syringe in place with the left until the blood reaches the 50 c.c. marks. The syringe is then removed with the right hand and passed to the assistant while the left forefinger covers the end of the cannula at the same time the tourniquet is temporarily relaxed but tightened when the next syringe is connected, and so on with each syringe. The nurse then passes the operator another syringe filled with salt solution to the 10 c.c. and the tip is introduced into the cannula and the syringe filled and so on until you have enough blood or some clot or obstruction occurs. When the assistant receives the full syringe, he removes the trocar, introduces the tip of the syringe into the cannula and gradually empties it and passes it to the nurse. She then washes it with salt solution and if it becomes clean reintroduces more vaseline and it is ready for use. If it does not clean it is discarded. Care must be used that the operator does not get ahead of the assistant, but the reverse does not matter. After about five to ten syringefuls have been transfused, it is well to remove the cannulas and clean them but if everything goes well, this is not absolutely necessary. When the desired amount has been obtained, the cannulas are removed, the veins ligated and the wounds closed. Apparently the introduction of moderate or even large amounts of air is not harmful. The special points in technic are gentleness, cleanliness and well-vaselined cannulas and syringes. Be sure to have sufficient assistants.

2025 Walnut Street.

ACUTE TRAUMATIC DISPLACEMENT OF THE UTERUS.*

BY

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(With two illustrations.)

Trauma has been conceded as a possible cause of uterine displacement for a long time but that it is rare in comparison with the other etiological factors is the opinion of most writers.

It is interesting to note that many of the standard text-books on gynecology do not mention it and others pass it by with but a casual reference.

Schultze(1) in 1888 in his book on uterine displacements, while recognizing its occurrence says "that an acute origin of uterine displacement is very rare (retroversion, prolapse from a sudden fall, puerperal inversion.)"

Penrose(2) says: "Many cases of retroversion undoubtedly originate during girlhood as a result of falls, blows, distortion of the body, or sudden efforts at lifting. The origin of the symptoms may be traced in many cases directly to some such cause."

Again as late as 1913 Von Franqué(3) in speaking of retroflexion alludes to the "rare instances of traumatic dislocation of the uterus."

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* Read before the Section on Gynecology and Obstetrics, New York Academy of Medicine, January 26, 1915.

There would seem to be two reasons for this:

First, trauma is discredited as being the immediate cause of a displacement because it is a matter of great difficulty to decide whether or not a displacement existed prior to the accident. Unless one had the very good fortune to examine a patient before the accident as in one of the cases reported by Chase(4), it would be impossible to prove beyond the question of a doubt that such a displacement had not existed.

A second reason for the alleged rarity of this type of displacement is that often the symptoms are misleading and insidious and hence the condition is overlooked.

From a study of a group of these cases I believe it is possible to regard trauma the direct cause beyond the question of a reasonable doubt, and I therefore wish to consider, so to speak, the acute surgical dislocation of the uterus, arising from external violence occurring suddenly as the result of an accident to a woman or young girl who just previous to the accident was apparently in a condition of perfect functionating as regards her pelvic organs.

I have in mind a group of six cases which I have seen during a period of ten years or more. Several of these cases I have had the privilege of treating, the balance have been medicolegal cases in which I have been the examining surgeon in accident suits.

Histories of the accidents have shown, as pointed out by other writers, that the violence has occurred:

1. As the result of falls on the back, or side in the supine positions, from being hurled off a car and landing on hard pavement.

2. Sudden falls in the sitting position, such as falls on the ice, on hard gymnasium floors, etc.

3. In sudden unexpected strains where intraabdominal pressure is enormously increased, as in lifting, pulling, etc.

In my series of cases a definite history of the first type of injury was found in two, of the second type in two, of the third type in one, and in the other case it was difficult to ascertain as the patient lost consciousness at the time of the accident.

Reaction to the injury at the time of the accident was variable: one case was unconscious and removed to the hospital in an ambulance; one case was semiconscious and removed to her home; three cases were able to return to their homes, and one case was injured at home.

All of the cases on account of their disability were confined to their homes for periods varying from about one week to several months.

The age of my cases varied from a school girl of fifteen to a woman of forty-three.

Five of the cases were nulliparæ at the time of the accident.

The symptoms may be well defined or very vague in these cases, and the diagnosis may be sprained back, contusion of coccyx, spinal concussion, "railway spine" and others which in no way suggest the uterus as a possible etiological factor.

I believe, however, that these cases can be recognized if the examining physician has in mind the possibility of an acute uterine displacement where there is present a fairly typical set of symptoms which are as follows:

1. *Pain.*—This is usually complained of in the lower portion of the back over the sacrum and coccyx. If the patient attempts to stand she may complain of a sense of slight nausea and vague distress in the epigastrium.

She further feels that things are "out of place," often describes an empty feeling through the hypogastrium. There may be "sharp, knife-like" pains in the lower abdomen, sometimes a dull ache which radiates down the anterior aspect of the thigh.

Pain is often localized over the sacroiliac synchondrosis, or down the course of the sciatic nerve.

Pain in the region of the rectum and painful defecation are sometimes complained of.

Again headache, generally occipital in type, may be a prominent symptom.

2. *Bladder irritability* is often complained of and may be a most distressing symptom, the urgency and frequency of micturition being so extreme that this becomes the chief cause of complaint as in one case in my series, where the distress came on the day after the accident and the woman was obliged to urinate about every ten minutes, passing small quantities at a time. In this case there was no incontinence. I have found no hematuria or other change in the urine of these cases and I believe the distress is purely mechanical in origin.

3. *Change in Type of Menstruation.*—There is sometimes a uterine hemorrhage immediately following the accident; this occurred in one case.

In two cases menstruation had become painful, prolonged, and too frequent in contrast to a previous normal type.

One case had not menstruated since the accident and at the time of my examination.

One case did not show marked menstrual changes. This case had early and successful treatment.

4. *A characteristic posture and gait,* which sometimes is so marked that it is the first thing noted on meeting the patient. The shoulders are generally stooped forward with head carried slightly forward and the dorsal and lumbar spine held in a position of slight kyphosis, the appearance being very similar to the posture of traumatic lumbago.

The lower abdominal muscles may be more or less contracted; the patient may be firmly supporting the same with her hand.

The gait is slow and guarded and devoid of the usual elastic spring, it being obvious that the woman is saving herself from any unnecessary jarring. In the sitting posture she may favor one hip or the other and tries to avoid direct pressure on the coccygeal region.

In some cases there is a spasm of the muscles of the back in the lumbar region and of the lower abdomen. In one of my cases this was extreme. On attempting to stand the spasm became board-like over the lower abdomen especially in the groins. A similar spasm occurred in the muscles of the back and it was impossible to get the patient to stand erect as the effort caused excruciating suffering.

A second case showed this same condition of inability to stand erect, but in lesser degree.

Another one of the cases complained of the great hardship of not being able to sit down as the pain was so intense and she could find relief only in the standing or recumbent position.

Vaginal Findings.—The various degrees of retroversion and prolapse are the types most often reported and complete prolapse is the rarest of all. Halban's(5) case was of this type. Personally I have not seen it (Fig. 1).

In my cases three types of displacement were found.

1. Those where the cervix remained in its normal plane in the pelvis and the uterus had swung over on its pivotal point through an arc of 180° and the fundus was lying in third degree retroversion or retroflexion.
2. Moderate degree of prolapse.
3. Cases where the uterus, as a whole, had been driven back into the hollow of the sacrum in the varying degrees of retroversion, fundus and cervix being incarcerated there.

Explanation of the Mechanism of these Displacements.—In referring for a moment to the anatomical relations of the uterus it will be remembered that in a normal pelvis the uterus lies in a state of elastic suspension. This is accomplished by a series of ligaments which are variously described by the anatomists. These ligaments have slightly different functions in maintaining this elastic balance. Thus the round ligaments are principally guy ropes to hold the fundus forward. Noble(6) has pointed out in his recent very interesting discussion of the mechanical principles in displacements of the uterus that "the round ligaments running from the cornua upward, outward and forward to the inguinal canal are so placed that they cannot effect a sustaining influence upon the uterus in the normal position nor are they put upon severe strain until the cervix protrudes from the vagina, for the uterus in backward and downward displacements describes an arc, the radius of which is constant. The functions of the round ligaments are to hold the fundus forward and to maintain its even balance in the pelvis. But when imperfectly developed or relaxed or elongated they fail in this specific function, then from the effect of posture or excessive distention of the bladder retroflexion occurs."

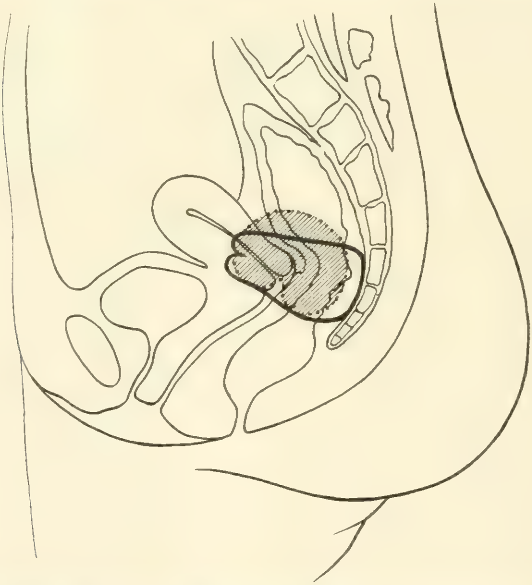

FIG. 1.—Showing the uterus displaced through an arc of 180° (or thereabouts), lying in retroversion or retroflexion.

Another point of anatomic interest he brings out in his article quoting McKay, in regard to the uterosacral ligaments, is as follows: "The muscular fibers which run in the uterosacral ligaments are more or less continuous not only with the fibers of the ureters but with the muscular fibers about the region where the ureters enter. There are also muscular bundles running from the sides of the bladder—

below where the ureter enters—to the vagina, and again from the vagina to the walls of the rectum."

Without discussing further the anatomical details which produce this position of the uterus, I will assume the normal uterus to be in a state of elastic suspension with normal ligaments and a normal pelvic floor.

Under these conditions the uterus is capable of a normal range forward, backward, upward and downward. Distention of the bladder or rectum, increased pressure from the superimposed abdominal viscera would all variously displace the organ temporarily within the limits of its normal range, but the organ would be capable of returning to its normal position.

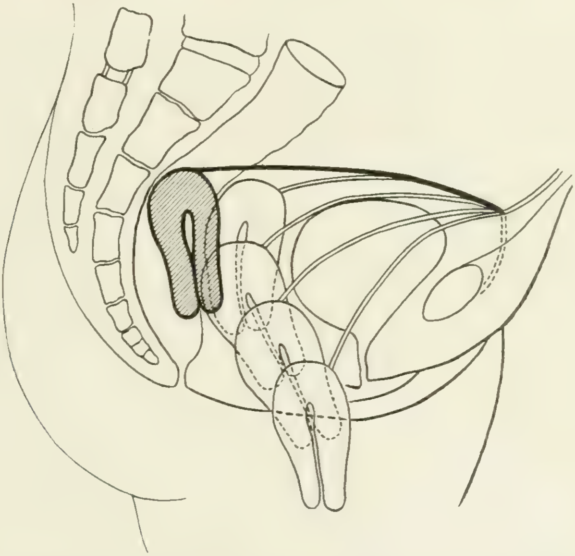

FIG. 2.—Modified after Noble: Showing the uterus (in shadow) displaced as a whole into the curve of the sacrum with the consequent extraordinary pull on the round ligament.

I would here like to compare the uterus in its setting to a perfect joint and compare the accidents I am about to describe to a dislocation of a joint.

Take first the accidents involved in Classes I and II described above—namely, falls on the back and in the sitting posture. Here, from the very position (backward), gravity would predispose to the backward direction of the uterus. There may be other predisposing causes such as distended bladder, relaxed ligaments, heavy uterus.

Then comes a violent force acting from without. The body, meeting a hard unresisting substance is stopped, but the uterus because of its elastic moorings is projected further by the impact and driven beyond its normal bound—in other words, dislocated.

A similar argument could apply to displacements arising from sudden, increased intraabdominal pressure.

The result of any of these dislocations is to put certain of the ligaments on the stretch and I believe in certain extreme instances actually tear the ligaments as in a dislocation of a bony articulation.

It would seem that there is an explanation for some of the symptoms as for instance, the pain and spasm in the groins. In these extreme backward displacements the round ligaments probably cannot act as guy ropes, but owing to the impelling drive of the uterus they are put immediately on the stretch and the arc of the circle described is no longer true, as the uterus under these extraordinary circumstances flies off at a tangent (Fig. 2).

In the instance where I found the board-like spasm in the lower abdominal muscles, the displacement was extreme into the curve of the sacrum, indicating that the pull on the round ligaments was considerable.

The bladder irritability is likewise easily explained along these lines.

On account of the intimate relations of the uterosacral ligaments to the bladder and ureters it can easily be seen how completely the normal relation is disturbed if suddenly a uterus is swung through an arc of 180 degrees dragging the uterosacral ligaments beyond their normal stretch. In the case cited where the urgent micturition was so distressing, the fundus of the uterus was jammed down in a condition of third degree retroversion being also sharply retroflexed.

Treatment.—The importance of an early diagnosis is very great on account of subsequent congestion and further sequelæ. The reduction soon after the accident is easy, as a rule, and probably best effected in the knee-chest position. The uterus will sometimes snap back into place and remain there and all discomfort immediately cease.

This was demonstrated in one of the cases where the diagnosis was made a day or so after the accident. The uterus snapped back into place; the young girl was kept on her abdomen for a week without further vaginal care. She was warned to keep the bladder emptied frequently, to avoid exercises where there was a concussion, as in the rise and fall of horseback riding, but was encouraged to continue swimming. She made a complete recovery with no menstrual difficulties and gradually resumed a vigorous athletic life. She has since married and was warned during the early months of pregnancy to resume the knee-chest position frequently and to sleep on her abdomen. She has had no difficulty with retroflexion of the pregnant uterus.

When the uterus has remained out of position for a week or more the congestion incident to trauma makes the reduction more difficult and less dramatic. It then becomes necessary often to tampon the posterior fornix and between treatments to use prolonged hot douching.

In one of my cases where the diagnosis was made probably within two weeks of the accident this was necessary. The recovery was complete, all symptoms subsided and the patient was able to return to a heavy professional life. I have kept in touch with this patient for over five years and she has needed no further vaginal care, though in the meanwhile she has been obliged to have an appendectomy and herniotomy at which time a uterine plastic could have been done.

In another case the condition was not discovered until after two months of great discomfort at home at the end of which time the patient sought medical aid. The uterus in this case did not return to the normal position until tamponage and douching had been resorted to, and it was necessary for her to wear a pessary for weeks. This case did not remain in as perfect position as the others and there seemed to be some shortening of the uterosacral ligaments which seemed to be progressive, suggestive that at the time of the accident there was some tearing of these ligaments.

The value of early diagnosis and treatment is apparent:

1. For the sake of the woman herself early recognition generally means complete cure. The longer the period of displacement the greater the loss of tone in the ligaments and changes in the uterus and appendages due to passive congestion, hence the smaller the chance of a nonoperative recovery.

2. It is of importance to arrive at a correct diagnosis because of the legal aspect of these cases(7). In four of my six cases this was an important feature. In two or probably three of the cases, the diagnosis had been overlooked. In two cases a rectal or vaginal examination had not been made.

As the terms "railway spine," traumatic lumbago, concussion of the spine, coccygodynia, traumatic neurasthenia, traumatic hysteria, may often be loosely applied to cases with grave organic lesions or functional disturbances of the cerebrospinal system with often unfavorable prognosis as to curability and return of the individual's capacity for work, in the eyes of the jury these terms may carry with them a verdict quite out of proportion to the real injury.

The true estimation of these cases is often difficult for in addition to the displaced uterus there may be some spinal injury and the disastrous effect of litigation on the nervous condition of these women must not be forgotten.

From my experience with these cases I would make an invariable rule that the pelvic organs should be carefully examined before any diagnosis is made.

An acute traumatic displacement of the uterus unrecognized may completely disable a woman for the time being. If it remains unrecognized the woman will probably drift into years of invalidism trying to adjust herself to her misplaced organs, and during this time she may develop symptoms which will justly give rise to the various conditions enumerated above.

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828 West End Avenue.

THE CLINICAL SIGNIFICANCE OF AMENORRHEA IN THE DIAGNOSIS OF TUBAL PREGNANCY.*

BY

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The symptomatology of tubal pregnancy, as recorded in the text-books and taught in the schools, embraces the following pathognomonic signs: (*a*) the skipping of a menstrual period, followed by

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* Read before the Obstetric Section of the New York Academy of Medicine, January 26, 1915.

(*b*) irregular uterine bleeding, and (*c*) the gradual formation of a tumor to one or the other side of the uterus.

The first of these symptoms, the skipping of a menstrual period, is strangely enough often absent in some cases of tubal gestation. Because of the insufficient attention given to this exception, many errors in diagnosis are frequently made by the best clinicians.

I do not refer to lactating women, or to women who menstruate irregularly, but to those whose menstruation is normal and who are positive as to the date of their last period.

How are we to explain this clinical enigma? We have no distinct set of causes underlying this exception. All we may say is, that in these patients, the same pathological factors that cause the disturbances in other cases of tubal gestation, manifest themselves at a much earlier period, before the onset of the next menstruation.

To substantiate this clinical observation I submit the report of the following cases:

CASE I.—G. M., referred by Dr. J. Koronefsky on January 2, 1913. Patient was twenty years old, married five weeks. Her menstruation began at the age of thirteen, regular in type, every twenty-eight days, painful at times, moderate in amount, four to five days' duration. She menstruated last on December 11, 1912.

Present Illness.—The last period had set in about one day in advance of the expected time, but it was scanty in amount and lasted for one week. The bleeding then ceased for a few days, when it recurred, and is still continuing accompanied by pain in the left lower quadrant of the abdomen.

Physical Examination.—Patient is of medium height, well nourished, color good. Heart, lungs and abdomen normal. Vaginal outlet nulliparous in character. There is a moderate amount of dark brownish sanguinous discharge present. Cervix normal, slightly softened, pointing to the left. The uterus is slightly enlarged, anterior in position and somewhat to the right of the median line. The right adnexa are palpable and normal. To the left of the uterus an elongated ovoid-shaped mass of rather tense consistency is felt. This mass is freely movable and the ovary could be palpated distinctly and apart from the tumor. The posterior and lateral fornices were otherwise free, and not tender to touch.

Clinical Diagnosis.—Unruptured tubal pregnancy. Operation, January 3, 1913. Abdominal celiotomy. The left tube was intact, bluish black in color, distended with an oblong mass measuring 2½ × 1 × 1 inches. The fimbriated end was edematous and free. There was a small quantity of serum in the bottom of the pelvis. A left salpingectomy was performed, and the patient made an uneventful recovery. She has given birth to a normal child since.

CASE II.—M. C., referred by Dr. A. Youdin. Aged thirty-eight, married twenty years. She has given birth to four children, the last one fourteen years ago, and miscarried once, twelve years ago. Her labors and puerperiums were normal. She began to menstruate at the age of sixteen, regular in type, painless, and profuse in character, lasting eight days. Her last regular period has occurred on October 12, 1914.

Present Illness.—On November 2, 1914, she began to bleed vaginally in the form of spotting. The spotting lasted for two days, it then ceased, but recurred two days later. Since then the bleeding is almost continuous, varying in amount from time to time, and is accompanied by abdominal cramps and general weakness. Has been confined to bed from the first day of illness.

Physical Examination.—A corpulent woman of medium height. Markedly anemic. Temperature 99.6, pulse 96, respiration 28. Heart and lungs were negative. Abdomen large, pendulous, showing striæ of previous pregnancies. On percussion there was dulness over the left lower quadrant, where an irregular tender mass could be felt. A moderate-sized umbilical hernia was also present. Vaginal outlet was relaxed, cervix soft, lacerated bilaterally, and free uterine bleeding was present. The uterus was situated in the median line, but pushed upward above the symphysis pubis by a mass that occupied the posterior and the left fornices. This mass was cystic below, but irregular and somewhat hard at its upper limit, which was on a level with the umbilicus. The right adnexa could not be palpated with any degree of certainty.

Diagnosis.—Ruptured tubal pregnancy and pelvic hematocele.

Operation.—On November 27, 1914, I performed a laparotomy. On opening the peritoneal cavity the omentum was adherent to the pelvic contents, shutting them off entirely from view. On separating it from its adhesions to the underlying viscera, a large quantity of viscid dark blood escaped. The intestines were now exposed and a few coils of ileum as well as part of the sigmoid were found to be in turn adherent to the uterus and its adnexa. These adhesions were now freed and the pelvic mass was exposed. The tumor was found to be situated below and to the left of the uterus, it filled the entire left half of the pelvis to which it was intimately adherent. It was about the size of a grape-fruit and had the appearance of a large laminated blood clot. On closer examination it proved to be a ruptured left tubal pregnancy with only the uterine and the fimbriated ends remaining intact. A left salpingectomy was performed. The right adnexa presented a condition of hydrosalpinx and cystic oophoritis, so they too were removed. The patient has made a most satisfactory recovery; she left the hospital on the sixteenth day. The specimen shows distinctly the uterine and the fimbriated ends, the rest of the tubal wall has been completely destroyed. In the center of this clot is an intact amniotic sack containing an ovum of about eight weeks.

Case III.—F. B., aged thirty, married seven years. Has given birth to two children, the last one five years ago. She has also miscarried once, four months ago in the fourth month of pregnancy.

She began to menstruate at the age of fifteen, regular, moderate in amount, of three to four days' duration. Her last period occurred nine weeks ago.

Present Illness.—Six weeks ago, *i.e.*, one week in advance of the expected menstrual flow, she began to bleed. The bleeding did not cease as usually on the fourth or fifth day, but it continued for three weeks. It then ceased for a few days, and recurred. The main complaint at present is irregular uterine bleeding for six weeks, and general weakness.

Physical Examination.—A medium-sized woman, well nourished, color good. Pulse, temperature and respiration normal. Heart and lungs negative. Abdomen soft, pendulous, shows striæ of previous pregnancies, otherwise negative. Vaginally: a relaxed outlet, no urethral discharge, moderate bleeding present. External os soft and patulous, and is pointing to the left. Uterus is slightly enlarged, anterior in position. Right fornix: an extremely soft, cystic tumor was palpated, and behind it, close to the right uterine horn, a rather tense nodule was felt, about the size of a hazel-nut. Left fornix: adnexa were free, apparently normal.

Diagnosis.—A tentative diagnosis of unruptured tubal pregnancy, and a parovarian cyst was made.

Operation.—On December 26, 1914, I performed an abdominal section. The right tube was irregular in outline, and at its uterine end, close to the uterine horn, it was distended with a bluish black mass, the size of an olive. The upper aspect of this tumor presented a minute rupture covered with laminated clot. The right ovary contained a very thin-walled cyst, the size of a hen's egg, which ruptured during the attempts at removal. A right salpingo-oophorectomy was performed, also an appendectomy. Abdomen was closed in the usual manner. The patient made an uninterrupted recovery. The microscopic examination showed the presence of chorionic villi.

CASE IV, No. 5556.—S. F., referred by Dr. A. Rosenthal. Aged thirty-five, married twelve years para-v, the last child three years ago. She has also miscarried once four years ago. Her menstruation began at fourteen, moderate in amount, of four days' duration. Her last period was November 12, 1914.

Present Illness.—On December 10, 1914, which was about one day in advance of her expected menstruation, she began to bleed vaginally, accompanied by cramp-like abdominal pains. Since then the bleeding is continuing with gradually increasing pains, which are aggravated during defecation. Twice, while moving her bowels, she became dizzy and felt faint. Her pains are now definitely limited to the right lower quadrant of her abdomen.

Physical Examination.—A small, poorly nourished woman, rather pale. Pulse was 76, temperature 99.8, respiration 20. Blood, white blood cells 21,000, polymorphonuclear 82 per cent., small mononuclear 18 per cent. Heart and lungs were negative. Abdomen: soft, excepting over the right lower quadrant, where an irregular semisolid mass is palpable. This tumor seems to be fixed. Vagina: outlet relaxed; there is a moderate amount of uterine bleeding. Cervix is soft and patulous, admitting tip of index-finger. It is pointing to the left. Uterus enlarged and pushed upward, forward and to the left of the median line. Posterior to the uterus, and to its right a fluctuating encysted tumor is felt. The upper border of this mass is on a level with the right anterior, superior spine of ileum; it is not movable. The left adnexa were not palpable.

Operation.—On December 21, 1914, I performed a curettage followed by an abdominal celiotomy. On opening the peritoneal cavity, a fair amount of free dark bloody fluid was found. The uterus was in the median line, high up, and toward the symphysis pubis. The inner half of the right tube presented an edematous appearance, dark red in color and of the thickness of a thumb. Its outer half was bent inward and backward and buried in a large blood clot, that filled the right and the posterior pelvic fossæ, almost up to the pelvic brim. The clot was removed and the tube delivered. This presented a rent on its upper surface, extending from its middle up to the fimbriated end. A right salpingo-oophorectomy was performed. The appendix vermiformis was adherent by its tip to the ectopic mass and covered with a few adhesions, so it was also removed. The left adnexa showed evidences of chronic inflammation, but, owing to the comparative youth of the patient, they were left *in situ*. The abdomen was now closed in the usual manner. She made a smooth and uninterrupted recovery.

Pathology.—The curettings failed to show any decidual reaction, on the contrary, the mucosa resembled that of the intermenstrual period.

Chorionic vill; were present in the tube.

RÉSUMÉ.

Each of these cases demonstrates the clinical fact that the history of skipping a menstrual period is not an essential diagnostic factor in all cases of tubal gestation. In the cases quoted the symptoms of disturbed gestation have set in immediately before or just about the time when the next menstrual period was due. So that the patient could most assuredly state that she did not "skip" a menstrual period. It behooves us therefore to keep constantly in mind that irregular uterine bleeding occurring immediately before or about the expected menstrual period, in conjunction with other well-known classical symptoms, is just as strongly suggestive of extrauterine pregnancy as is the bleeding that takes place after the missing of one period. This exception if properly interpreted and tempered with mature clinical judgment will frequently prove the rule and will help to lessen diagnostic errors in extrauterine pregnancy.

1261 Madison Avenue.

A RAPID METHOD OF DETERMINING THE EXPECTED DATE OF CONFINEMENT.

BY

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It is often desirable to compute the date of expected confinement from the date of the last regular menstrual period rapidly and without recourse to an obstetrical calender.

For some time I have used a method which has no doubt been used by others though I have not seen it described.

The method consists in using the number of the month instead of the name, subtract three from this and it gives the ninth month from that one. If, for example, the date of the last menstruation were in July or the seventh month, by subtracting three we would have April or the fourth month ($7 - 3 = 4$). By adding the requisite seven or ten days we have the approximate date of confinement. If the date is toward the last of the month it would throw it into the month following. If the last period began July 28 as indicated above, April 28 would be nine months from that date, adding seven days would make it May 4.

If the last menstrual flow should occur in January, February or March, we would regard them as the thirteenth, fourteenth or fifteenth months instead of the first, second or third. I have found this to be a very rapid and easy method for estimating the time and as accurate as any of the ordinary methods.

It is equally possible and no more difficult to add nine to the month of last menstruation than it is to subtract three. It might even be easier in those cases where the last period came in January, February or March, for example, 1 plus $9 = 10$, or October; 2 plus 9 $= 11$, or November, etc. The same plan may be applied, by estimating the time from the first date of feeling life, adding five to the date instead of subtracting.

CORRESPONDENCE.

"A NEW METHOD OF PAINLESS CHILDBIRTH."

To the Editor of the American Journal of Obstetrics:

The article published in the last issue of the AMERICAN JOURNAL OF OBSTETRICS (February, p. 249) with the above caption should not be allowed to pass without criticism—especially as the article apparently was written in ignorance of the true status of the drug he advocated. The heated, and at times acrimonious, debates which were aroused by Sir James Y. Simpson's introduction of anesthesia into obstetric work could not have a place in present-day discussion—whether anesthesia should or should not be used on the parturient woman is to-day merely of academic interest—is merely a phase in the history of modern obstetrics. I know no physician who does not eagerly await the day when a woman may painlessly pass through her labor—but it is no advance unless this freedom from pain is accompanied by the elimination of risks to mother and child, or at least, the jeopardy to the two concerned is not enhanced by new methods. There has been so much written in the advocacy of the so-called twilight sleep that is the worst kind of sophistry—and this has not been alone contributed by the lay writer with a smack of yellow journalism, but only too often given from the pen of those who apparently are playing their cards to satisfy the hysteria of the lay mind. We have too often in the course of late years seen a wonderful new discovery exploited in the lay press, only later to have the public learn what dross had tinctured the exploitation. One of the most beneficent duties of the modern physician is to narrate in the lay press and magazine, without technical language, the advances in various directions that modern medicine has accomplished, but to reach the height of altruism, debatable topics should not be discussed before the laity—above all things, those unproven discoveries which arouse hysteria in the mind unskilled to interpret properly moot medical problems should be thrashed out in the medical journal or privacy of the societies of medical men. There is a very prevalent distrust of the medical profession in the minds of many of the laity; and nothing engenders this so much as the running to fads which have no real scientific worth. That the time is coming when all women safely and well may secure the beneficence of labor entirely free from pain, I, least of all would deny; that this so-called twilight sleep is the boon some would have us believe I would most emphatically repudiate. The use of this new method of securing painless childbirth is but an illustration of one blindly taking the word of a manufacturer of a proprietary article made to cater to the wants of an overzealous profession.

The December issue of the *Cosmopolitan* contained a vapid, hodgepodge of fine writing by Vance Thompson, under the caption of "Motherhood Without Fear". It was lurid with the vainglorious phrases worthy of a patent medicine advertisement. This article gave publicity to the reputed discovery of a Paris, France, chemist, who "found after long years of research—the miraculous drug which has saved women from the ancient curse." Dr. Paulin, the chemist, "set out to find a drug which should be harmless and which should do away with all pain without interfering with the orderly and rhythmic process of birth." . . . "He took a solution of chlorhydrate of morphine and treated it with a living ferment. The morphine, thus treated, was transferred into a regularly crystallized substance. Officially, it is known as *morphine désintoxiquée*—that is, the toxic qualities are removed—and is distinguished from oxydimorphine chiefly by its solubility."

The article goes on to state how for two years this detoxicated morphine was tried out on the rabbit, cat, and the grosser mammals of the farm yard. "What all these animal experiments showed was that the new drug, while it suppressed the pain of birth-giving, conserved wholly the muscular activity. This was the solving of the whole problem. Here was a medicine that did no harm, that did not check or hinder nature's way—that did, indeed, leave nature freer than had otherwise been—and that did banish and abolish the hideous fear that clutched and tortured every female thing." Again "*Morphine*, chloral, chloroform, and the like will still the pains of childbirth, but they have the defect of checking muscular contractions—or at least of diminishing them."

As a result of these wonderful studies by the chemist, Dr. Ribemont-Dessaigne tried out the drug, and reported his findings from the use in 112 cases. His findings were presented to the Academy of Medicine, Paris. Ribemont-Dessaigne claimed that all excitement was absent, and that "those who bore children in the evening fell quietly asleep, and slept until day." Of the children, "seventy-seven roared lustily, attesting their physical health. Of the others, twenty-eight came dumb into the world but the regularity of their heart beat, the rosy tint, the tonicity of their muscles were ample evidence of sound health. There were ten others. These ten new-born men and women preserved a stolid and disquieting silence." It was not mentioned that six of the babies died before or after birth.

Can you imagine a more graphic description of babies who have received a drug which is a respiratory depressant.

In this array of quotations you will see the inference, better declaration, is made that the drug is innocuous. To quote a little more. "I do not write of this discovery as being in an experimental stage. It has been accepted by the French Academy of Medicine—the date was the third week in July. Surgeons, gynecologists, chemists, doctors of all degrees examined, tested, approved. For once scientific men have been unanimous."

Those who have read the editorial in the *Journal of the American*

Medical Association, December 19, 1914, p. 2233, need not my feeble pen to know the truth, but many have not learned the true facts, and will be tempted to try out the drug, only to be met with disaster. To the uninformed, it would be well to read this editorial.

It is true that Paulin did make the claim that he had a derivative of morphine obtained by the action of a ferment (living) upon chlorhydrate of morphine—that he claimed it was different from oxydimorphine chiefly by its increased solubility—it is true that Ribemont-Dessaigne did use it on 112 women in labor—that he did report his findings to the Academy of Medicine of Paris. But Ribemont-Dessaigne did not present the formula of the new drug to the Academy, for he did not know it.

To obtain publicity, it has been intimated, that Dr. Paulin used his influence to have the Minister of War request the Academy if they approved the use of the drug (under the names, Tocanalgine and Antalgine) in the military hospitals as a substitute for morphine. By unanimous vote the Academy declared that as they neither knew the formula nor its composition they could not recommend it. A committee was appointed by the Academy to investigate the problem. To quote from the Journal editorial—"Since it was stated, however, that the new drug was produced by the action of enzymes on morphine, the Academy appointed a committee to investigate oxidimorphine, a chemical substance which it was known could be produced by the action of enzymes on morphine." The only active ingredient found in Paulin's samples was morphine hydrochlorid, varying in amount from 0.05 to 4 per cent. "The conclusions of these two chemists were later emphasized by Bertrand, who, after careful chemical and biologic tests of samples submitted to him, found that the solid residue was exclusively formed of hydrochlorid of morphine, and that it was fully as toxic and dangerous as morphine, as might have been expected; the symptoms of poisoning were exactly the same as those of morphine hydrochlorid, and death occurred after the same interval. A dose of the preparation would give about ½ grain of morphine."

The knowledge that morphine does retard, if not inhibit, uterine muscular activity has been known for years—it is so trite that one certainly would stultify himself who would claim anything else. It is equally settled that morphine inhibits action of the emunctories, especially those of the intestine and kidney. To maintain that this detoxicated morphine caused an increase in the activity of the salivary glands, intestines, and kidney is merely making statements based on erroneous deduction and observation. It has been the knowledge of obstetricians for years that morphine given in heroic doses in pregnancy has little effect upon the child provided the mother is not killed: as the respiratory center in the medulla of the unborn child is quiescent the *fetal* effect of an overdose to the mother is negligible. The result is very different when the ordinary dosage, ⅛ to ¼ grain, is exhibited in relation to birth. No one may determine in a given woman how quickly morphine will be eliminated—unquestionably, in some, two or four hours might be sufficient—

others may take hours. If the time of the birth of the child bears a close relation to the exhibition of the drug, the child may show marked signs of narcotization—this is evidenced not by an asphyxia, not by an oligoapnea, but a true arrest of breathing due to the paralyzant action of the morphine upon the child's respiratory center. Before hyoscine was introduced as a uterine anodyne in labor in 1902—in a period when morphine ignorantly was exhibited rather indiscriminately, the writer repeatedly has seen babies which were not asphyxiated, but narcotized, necessitating most prolonged artificial respiration and stimulation.

What man or woman would not be relieved of pain by an hypodermic of a grain of morphine!!! It is just as one would expect that Ribemont-Dessaigne found 30 per cent. more or less deeply narcotized, and of this percentage, nearly a third dangerously morphinized. Would not a grain of morphine, given to a woman, where already her unborn child gave signs of "doing poorly," finish nature's effort? Might not the death of the two babies whose demise was due to convulsions and meningeal hemorrhage, be directly due to tetanic convulsions aroused by the irritation of the spinal cord, for in lower animal life, as the frog, and very possibly in infants newly born, during the arrested cerebral functionating, morphine may have a primary, selective action upon the medulla and cord? Might not a half grain of morphine, shortly before birth, account for an added impetus to the lethal outcome for the three premature babies? We may put this drug, merely morphine under a new name, down as one of the most serious menaces to the woman and child that have yet been exploited in the name of painless birth. To have this proprietary medicine placed before the profession, and to have them fall to it, will spell a more widespread death toll of the new-born child; taking it, she (the woman) "may bear children not in pain and terror," but will she have "gladness" thrust upon her when her dead baby is placed in her arms? But the physician will reap the whirlwind of merited censure as the result of the deaths of infants.

As the writer of the article under discussion animadverted upon the twilight sleep, it is pertinent to express some thoughts thereon. Each and every exponent of the twilight sleep maintains that hyoscine is not so good as scopolamine: chemists tell us they are chemically identically the same, having the formula $C_{17}H_{21}NO_4$, and that the physiologic action is the same—that the varying effects are directly due to undetermined impurities contaminating hyoscine as obtained from hyoscyamus, or scopolamine as obtained from scopola: further it is known that hyoscine-scopolamine exists in two isomeric forms, distinguishable by optical rotation—in one, there is refraction of polarized light to the left, in the other, there is no such refraction. Cushny, Peebles, Hug, and others accept that the levorotatory form is the more potent, the other, less active. As one of the largest drug houses of Germany have repeatedly stated the identity of the two, and clinically to an enormous extent it must be true, for they marketed the two drugs under their respective titles, supplying *both from the same stock bottles*, there can be no question that the advocates of scopolamine at the expense of hyoscine have made unwarranted, unscientific deductions.

It would needlessly encumber this paper to enumerate all the irrational, unscientific statements made by the exponents of the theory of twilight sleep—but a few will demonstrate the popular absurdity. In a recent meeting a physician made the statement that the babies were *brighter* when born under twilight sleep than by other means: if this were true, and the contention is made that one or more doses has an abiding stimulation of cerebral activity, then we certainly are derelict in our duty in not giving all people who are thoughtless and mentally deficient periodic doses to stimulate mental activity.

Again, that under twilight sleep the babies gain in weight more rapidly so that by the time of leaving the hospital—at the end of two weeks—the birth weight has been regained: it is a generally accepted opinion of obstetricians that normally the birth weight is regained by the eighth or tenth day.

Further, we hear the statement that forceps operations have been reduced to a negligible point at Freiberg—6 to 7 per cent.—since the routine use of twilight sleep. Of course, the frequency of any operative procedure is very largely determined by the personal equation of the operator—many lightly undertake the operative intervention—while others, will strictly adhere to more drastic rules. So much has been written, however, on the diminution of the forceps frequency under twilight sleep that it is worthy of comparison to see the statistics of Austro-Germany with the application in Freiberg: the following figures are taken from Winckel's *Handbuch der Geburtshülfe*, p. 556, Band 3, Teil 3.

Münchmeyer (Leopold-Dresden)	1883–1888	7,322	206	2.8	per cent.
Wahl (Leopold-Dresden)	1889–1894	9,061	232	2.5	per cent.
Schmid (Fehling-Basel)	1887–1893	2,926	156	5.33	per cent.
Schick (Rosthorn-Prag)	1891–1894	2,920	106	3.6	per cent.
Heseman (G. Veit-Bonn)	1885–1895	4,122	181	4.4	per cent.
Raebiger (Pernice-Griefwald)	1887–1896	1,683	101	6.0	per cent.
Spiegelberg (Breslau)	1865–1882	4,864	117	2.4	per cent.
Baeskow (Ahlfeld-Marburg)	1885–1897	4,000	110	2.75	per cent.
Hoffmann (Schultze, Jena)	1863–1888	2,533	294	11.6	per cent.
Hauff (Säxinger, Tübingen)	1869–1882	2,207	138	6.55	per cent.
Winternitz (Säxinger, Tübingen)	1882–1895	4,280	158	3.6	per cent.
Kissing (Säxinger, Tübingen)	1895–1900	2,018	62	3.07	per cent.
Winckel (München)	1883–1902	20,604	536	3.08	per cent.
Schulz (Hofmeier-Würzburg)	1889–1895	2,800	66	2.35	per cent.
Sichler (Kaltenbach-Halle)	1887–1894	2,015	102	4.8	per cent.
Toth (Tauffer-Budapest)	1883–1898	7,775	155	1.9	per cent.
Walla (Kesmarsky-Budapest)	1882–1895	11,064	115	1.04	per cent.
Semon (Abegg-Danzig)	1887–1897	2,831	123	4.3	per cent.
		95,025	3,057	4.5+	per cent.

As these figures show there is only one clinic whose forceps frequency exceeds those of Freiberg: there are but two whose figures equal those of Freiberg, and those are of clinics where not much more than 175 cases occurred a year. In small clinics it is a safe assumption to make that "Schulzange" are of frequent occurrence, the making of material for teaching purposes. We have, therefore, the facts which warrant the statement that the contention of those who maintain twilight sleep enormously reduces the necessity of instrumentation is founded upon false assumption, coupled with the fact that Frankenthal, after most painstaking observation, found that labor was prolonged by the use of hyoscine-morphine, and what has just been deduced from the frequency of forceps, it is fair to state that the so-called twilight sleep directly increases the necessity of forceps by unduly prolonging labor.

However, the fact that one man has one or even five per cent. more or less forceps operations than another is immaterial—that may be ascribed to personal judgment. A real issue is that approximately 20 per cent. of people given full doses of hyoscine-scopolamine have an actual active delirium, to that degree, not infrequently, they must be restrained: in not far from 40 per cent. there is more or less of active delirium—from these we dwindle down to the few who fall into a deep sleep suggestive of that brief period when Adam had the rib extracted, or in whom the dosages have no characteristic influence. We have the Freiberg exponents own admission that the success or failure of twilight sleep rises or falls directly as the fact of the presence or absence of the anxious friends and family of the patient who perceives but does not apperceive. This is the one condition which makes real success possible. Quiet may far better and more easily be secured in the home than any hospital—but in the home the family cannot be eliminated—therefore, the woman must be isolated in a sound proof, specially built hospital. For many years the writer has taught and practised that a labor cannot be properly conducted in the home—it is an exceptional circumstance when he has a confinement in the home—but women who have special risks in confinement always should be in a properly equipped hospital—and as women and their babies loaded with morphine and hyoscine are special risks, necessarily they must be where all prophylactic measures will be at hand.

There is one aspect of this twilight sleep problem which has not been broached publicly, and that is the impossibility of carrying out the modern proper technic of obstetric cleanliness when the woman is actively delirious if not maniacal. Within the past days in Chicago two internes were literally "beaten up" in their attempts to coerce the patient as the child was being born—imagine the kind of asepsis which would be observed under such circumstances—the woman howling, squirming, kicking and waving her arms! I am sure there will be an increased morbidity, if not mortality, directly due to slovenly obstetrics before this hysteria dies down.

What influence has been brought to bear which determined the ball rolling—a condition which may not inaptly be called the "globus hystericus of twilight sleep"—over this United States? Was it of spontaneous generation or was it launched by premeditated design?

It is not hard to judge. Far be it for me to criticise a guest of a society of which I am a member, but as the criticism already has appeared in print it is not unseemly to mention a fact which is very relevant to the sponsorship of all this lay publicity. It may be remembered that Professors Kroenig and Gauss read a paper by invitation before the Chicago Gynecological Society, which paper was also presented before the Clinical Congress of Surgeons of North America, November, 1913. Dr. A. L. Mann (*Illinois Medical Journal*, p. 264, April 1915) has a very instructive article covering the ethics of twilight sleep, from which article the following quotation is taken: "In speaking of an "unethical foreigner," I refer directly to Dr. Kroenig of Freiberg, basing my statement on the manner in which he introduced the proprietary preparation which he calls narcophin to the medical profession of this country, by taking advantage of the courtesy of an audience granted him by the Clinical Congress of Surgeons of North America in November, 1913, and also by the Chicago Gynecological Society, November 15, 1913, on both of which occasions he read a paper, the caption of which was "The Difference Between the Older and Newer Treatment by X-ray and Radium in Gynecological Diseases," but which after a short dissertation on the subject proper drifted into an exploitation of narcophin under the guise of a dissertation on "twilight sleep," a full report of which appears in the May, 1914, number of *Surgery, Gynecology and Obstetrics*, which shows 101 linotype lines required to dispose of the title of the paper, while 201 lines were devoted to the subject of narcophin. This bait being apparently swallowed whole by the medical profession, Kroenig then makes his next bid to the laity by appearing in *McClure's* for June, 1914, published with the full knowledge and consent of both Kroenig and Gauss."

As the writer sees it the toll which must be paid, is a prolongation of labor, increased frequency of forceps, the immediate danger from the slips in cleanliness—the development of sepsis—many babies seriously compromised if not lost as a result of the narcotics, and an occasional woman placed in jeopardy—if not killed by her idiosyncrasy to hyoscine and morphine. It will not be long before the physician will begin to pay his toll by increasing numbers of damage suits as the result of the death of the baby, or the real or imagined injury to the mother. The proponents do not speak of the increased frequency of malpractice suits in Germany brought about directly by the advocacy of this old worn-out method—last July there were twenty-five malpractice suits pending in one German city, the basis of the allegation being the use of scopolamine-morphine.

From all this mass of data in rebuttal it may be surmised that the writer has not employed the twilight sleep; he was one of the early ones to try it in Chicago—and from its failures in his hands and elsewhere he discarded it. From time to time there has been an occasional woman who early required active alleviation of her painful contractions; in such when chloral, bromides failed, and it was too soon to employ an obstetric anesthesia, hyoscine alone has been exhibited—that it was partially successful met all the requirements.

His whole contention is to use his small powers to combat the promiscuous, general routine of the so-called twilight sleep—as an expedient in a few selected cases it may be of value.

I can but quote the remarks made by one of our most able obstetricians anent this whole question. "If you will use it, have the patient in the best hospital possible, with all the appurtenances appropriate for the revival of the child; if you do not know, learn at once the differences between asphyxia, oligoapneia, and narcotic poisoning, and the methods of treating them, get the best and most reliable product called scopolamine, and then be sure you are in a position to be adequately defended by a lawyer versed in malpractice suits.

Welcome the day when we may have the drugs which will grant women painless labor, and will vouchsafe the lives of mother and child.

The writer has to thank Dr. J. M. Francis who kindly summarized for him the chemistry of hyoscine-scopolamine.

RUDOLPH WIESER HOLMES, M. D.

March 28, 1915,
33 East Elm St.,
Chicago, Ill.

CONGENITAL ABSENCE OF THE EYEBALLS.

To the Editor of the American Journal of Obstetrics, etc.:

Dear Sirs: I read the article, "Unusual Case of Congenital Defect; Absence of Eyeballs," by Mary Strong, M. D., in the June number of THE AMERICAN JOURNAL OF OBSTETRICS. Having had a similar case I thought perhaps you would like to report it in your journal. It has not been reported as yet.

January 20, 1910, I delivered a male child without eyeballs. He was healthy and well-formed except for this defect. His lids were somewhat smaller than usual. The palpable fissures were about one-fourth inch long and required some effort to open them. The lashes were normal. One week after birth I called Dr. F. J. McKechnie of New York City to see the child. He could find no trace of eyeballs. June 21, 1910 was the last time I saw the baby. He then seemed to be in perfect health. Shortly after this the parents went to Italy.

The mother's history was as follows: Italian, twenty-five years of age. Married seven years. Always healthy and well. Two years after marriage having had no children was curetted. Two years later was curetted again. The following year had a spontaneous, complete abortion. Sept. 22, 1908 she came under my care. She was then pregnant. Her last menstruation was April 22, 1908. Pelvic measurements 20 1/4–25–27–92. January 5, 1909, delivered her of a healthy boy L. O. A. forceps in the lower canal. The indications for forceps were slight and infrequent pains and length of time in labor. She made an uneventful convalescence. Was up on the tenth day. June 19, 1909 she called at my office. She was nursing and complained of extreme weakness. Examination disclosed the fact that she was again pregnant. I had her stop nursing, gave a tonic and advised rest. She rapidly improved and in two weeks was herself again. January 20, 1910 delivered her of the above described child, L. O. A. position, forceps in lower canal. The indications for the forceps were the same as in the previous labor. There was no history of any congenital defects in either the father's or mother's families.

Very truly yours,
MERRILL A. SWINEY.

TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

Meeting of January 12, 1915.

The President, JOSEPH BRETTAUER, M. D., *in the Chair.*

DR. HIRAM N. VINEBERG presented a

LARGE SARCOMATOUS TUMOR OF MESENTERY, REMOVED TOGETHER WITH EIGHT INCHES OF SMALL INTESTINE.

Mrs. B. G., aged twenty-nine years, married eleven years, was the mother of three children, the youngest being two years of age. Her labors and puerpera were normal. Her previous history was unimportant. She had always enjoyed good health. Three months before consulting the doctor, which was on December 22, 1914, she took a Turkish bath just after she ceased menstruating. The flow returned, lasting two or three days and was attended with severe abdominal pain. The next menses recurred at the normal time and was also attended with severe abdominal pain. The third menstruation, which was during the previous week, was normal, as to time, but was scanty. The pain was decidedly less than on the two previous occasions. The patient was well nourished, had good color and pulse and temperature were normal. On bimanual examination, an abdominal tumor was found lying chiefly to the left of the median line and reaching up midway between the umbilicus and the left rib border. The tumor was not very movable and was cystic for the most part. The uterus was small and lay behind the tumor. The diagnosis of cyst of the left ovary was made, with probable twisting of the pedicle, as evidenced by the recent attacks of pain.

On December 26, she was operated upon by Dr. Vineberg, at Har Moriah Hospital. On opening the abdomen, there was found a moderate quantity of ascitic fluid. The tumor appeared to the naked eye, at first, like a papillomatous cyst of the ovary, but on further investigation, it was found that it had no connection with the pelvic organs, although it lay in part in Douglas' culdesac and was moderately adherent to the pelvic floor. Noting that a portion of small intestine crossed its upper surface, it was recognized as a growth arising from the mesentery. After dividing the adhesions, the tumor, the cystic part of which had ruptured in manipulation, was removed together with the overlying portion of small intestine, which was about 8 inches in length. The ends of the intestines were sutured and a lateral anastomosis made by sutures. The patient made an uninterrupted and uneventful recovery and left the hospital on the fourteenth day after the operation.

The tumor was the size of an adult head and was found by Dr. S. Geist to be a spindle-cell sarcoma, whose center showed necrosis, hemorrhage and cystic formation. The attached portion of intestine was free from any elements of the growth.

The case is of interest (1) from its comparative freedom of any symptoms, (2) from the difficulty of diagnosis and, (3) from its rarity.

The symptoms of tumor of the mesentery are not characteristic. They consist, chiefly, of pain, marked constipation, nausea and vomiting. The only symptom present in our case were somewhat irregular menstruation attended with severe pain, which was growing less with each subsequent period, for the preceding three months. On local examination these tumors offer a point in differential diagnosis in restricted mobility. This feature was not so marked in our case as to excite undue attention and the plausible diagnosis of ovarian cyst was made, for which these tumors are usually mistaken. The rarity of these growths may be inferred from the circumstance, that during twenty years of active abdominal surgery, it was the first time Dr. Vineberg encountered such a growth. Thus far, in the literature, only eighty-five cases of solid growths of the mesentery have been reported, of these sixteen were carcinoma, nine were fibroma, ten were lipoma, and eight were sarcoma.

DR. JOSEPH BRETTAUER, in discussion said: In view of the infrequent occurrence of these cases, it is rather peculiar that within six months I have seen two such cases. The first one developed from the sheath of the large abdominal vessels. It was entirely retroperitoneal and, to my sorrow, I thought that I could remove the mass and went further than I should have gone and the patient died within twenty-four hours with about half a dozen clamps left inside as the only way to control the hemorrhage. Within a few months I operated upon a woman for multiple fibroids. One large mass which was supposed to be a retroperitoneal fibroid proved to be an entirely separate neoplasm, retroperitoneal and most likely of the same character as the one first mentioned. She died three weeks after operation. No autopsy.

DR. S. WIENER presented a report on

LARGE VAGINAL FIBROID IN A VIRGIN.

The tumor, a simple fibromyoma, was 10½ inches in circumference in the fresh state; but is now considerably shrunken from the formalin solution in which it has been preserved. The irregularity on its surface marks the point at which pieces were removed for histological examination. The interest of the case lies in the location of the growth, and in its method of removal.

Celia A., a single girl twenty-two years old, admitted to Dr. Krug's service at Mt. Sinai Hospital, September 7, 1914. Surgical number 148,573. Menstruation began at sixteen, was regular every four weeks, lasting four days, with considerable dysmenorrhea until six months ago. After that the dysmenorrhea ceased, and the menstrual periods began to extend to seven and eight days with excessive flow. The bowels moved regularly; no disturbance of urination. She had never experienced any pain other than the dysmenorrhea. The sole complaint was severe and increasing menorrhagia.

Examination showed a well-nourished young woman with moderate pallor. The hymen was intact; one finger introduced into the vagina disclosed a smooth rounded mass completely filling and blocking it. Combined rectoabdominal examination showed a hard, smooth, rounded tumor low down in the pelvis, just behind the symphysis, and bulging well into the rectum, fixed and nonfluctuating. It was not possible to palpate the uterus or adnexa. Probable diagnosis, submucous fibroid.

Under ether anesthesia Dr. Wiener attempted to pass a finger along side of the tumor to reach the cervix, but so tightly was it wedged into the vagina that this was not feasible. The Elliot obstetric forceps were then applied to the tumor in a typical manner and after several strong downward and backward tractions it was possible to pass the finger in between the tumor and the symphysis, and to discover that the growth was attached by a pedicle passing into the cervix. This cleared up the diagnosis. The rest of the procedure was a typical low forceps delivery, except that instead of a somewhat yielding fetal head we were dealing with a hard inelastic tumor. There was very marked distention of the perineum, and episiotomy was considered, but not done. The result, as was not unexpected with the firm unyielding soft parts of a virgin, was a lateral tear of the perineum of moderate degree. With the tumor outside the vulva its pedicle was seen to be a flat band about 1½ inches across which sprang from just above the region of the internal os. This was ligated close to the uterine wall and divided. The perineal tear was sutured, reconstructing the hymen. The uterus itself was exceedingly small, its length measured by the sound being 1½ inches.

The following were the points of interest mentioned in connection with the case:

1. The disappearance of the dysmenorrhea six months before admission; doubtless this coincided with the complete extrusion of the fibroid from the uterine cavity. It evidently proved a most efficacious means of dilating the cervix.

2. The total absence of any interference with urination and defecation and the absence of pain or other pressure symptoms. The patient was wholly unconscious of the presence of a foreign body. In view of the large size of the tumor this must be explained by a slow growth.

3. The small size of the uterus (1½ inches in length) from which this large growth sprang.

4. The method of delivery by the obstetric forceps, obviating a morcellement and possible hemorrhage in an already somewhat exsanguinated patient.

DISCUSSION.

DR. W. S. STONE asked Dr. Wiener if he understood that he had spoken of this growth as a fibromyoma of the vagina, to which Dr. Wiener replied that it was of the uterus.

DR. G. H. MALLETT stated that he regretted the fact that Dr. Wiener had only mentioned the dimensions of the pedicle in one direction, 1½ inches he thought the doctor said, without saying how thick it was, to which Dr. Wiener replied that the growth was just a broad flat band; that he would not like to say what the exact dimensions of the pedicle were.

DR. JOSEPH BRETTAUER said he would preferably remove such a growth by morcellement and believed that this case could have been delivered with much less risk, and possibly much quicker, with two or three cuts of a strong scissors.

The following report on

END RESULTS, FOR ONE YEAR, OF INDUCTION OF LABOR ON MOTHER AND CHILD.

was presented by a special Committee previously appointed consisting of DRS. KOSMAK, BEACH, FORD and WILBUR WARD.

TO THE NEW YORK OBSTETRICAL SOCIETY:

Your Committee appointed to conduct an inquiry on the end results of the induction of labor desire to present the following preliminary report, to be supplemented at a later time, when further material has accumulated.

The inquiry was primarily intended to elicit certain information which would permit a comparison of the conservative methods of terminating pregnancy in contrast to those of a more strictly operative character. For the purpose of obtaining a comprehensive impression of the cases upon which a study of the subject might be based, the committee prepared and sent to the members of the Society a questionaire of which the following is a copy.

INQUIRY ON THE RESULTS OF THE INDUCTION OF LABOR.

Name of reporter.
Hospital service.
Patient's name.
Age.
Nationality.
Parity.
Previous history and other remarks.

A. Indications for induction (only cases with viable child to be considered except as noted below).
  1. Maternal factors.
    (a) Deformity of pelvis, type.
    (b) Fibroids, ovarian cysts and other neoplasms in pelvis or generative organs.
    (c) Constitutional conditions.
      Heart disease,
      Tuberculosis,
      Cancerous diseases in other parts of the body,
      Toxemia of pregnancy,
      Nephritis, acute or chronic, not connected with eclampsia.
      Diabetes,
      Chorea,
      Pernicious anemia,
      Leukemia,
      Pyelonephritis,
      Acute infectious diseases,
      Accidental hemorrhage from the generative tract,
      Other causes not previously mentioned.
  2. Fetal factors.
      Excessive size of child,
      Hydramnios,
      Placenta previa,
      Monsters, including hydrocephalus,
      Premature rupture of membranes,
      Habitual death of fetus,
      Dead fetus.

B. Method employed.
  Rupture of membranes,
  Dilating bags, number of bags required, Variety,
  Bougies, number of bougies required,
  Gauze pack, number of times packing necessary,
  Manual or instrumental dilatation, state of cervix when begun.
  Drugs—pituitrin, etc., state of cervix when begun.
Period of gestation at which induction was done.

C. Results:
  Immediate, as to mother.
    Onset of pains, time elapsed after interference,
    Length of labor,
    Character of pains,
    Method of delivery, whether spontaneous or operative,
    Lacerations of cervix and perineum,
    Hemorrhage,
    Antepartum temperature,
    Postpartum temperature,
    Puerperal sepsis,
    Other complications:
      Change in presentation,
      Malpresentation,
      Prolapse of cord.
  As to child.
    Living or dead,
    Weight and development,
    Asphyxia—degree.

D. End results at end of one year, as to mother.
  Living or dead,
  General health,
  Has condition for which labor was induced persisted,
  Local conditions, including position of uterus,
  Involution,
  Condition of cervix,
  Rectocele,
  Character of menstruation.
  Child.
    Living or dead,
    If dead, cause of death and age at time of death,
    Development and growth,
    Nursing.

The number of cases contributed totals 293. In most of these the histories are fairly complete as regards the immediate results (in two cases labor was induced before six and one-half months, non-viable), but in the large majority practically nothing has been reported as to the results at the end of a year relative either to the mother or the child. This is most unfortunate but considering the difficulty of following up cases, especially those which have been in hospitals as patients, this is not to be wondered at. The following statistical results are worthy of note.

The average age of the 293 patients was 28.24 years; the youngest being fourteen and the oldest forty-two years. In 118 cases the patient was a primipara. In seventy-three cases there was a previous child, in ninety-seven cases two previous children, in sixty-six cases three previous children. In twenty-nine cases there was a history of previous stillbirths from operative or other causes.

In reviewing the indications for induction of labor only those cases with viable children were considered. Beginning with the maternal factors we find that deformity of the pelvis was given as an indication in fifty-two cases. The period of gestation in which labor was induced varied from thirty weeks to a period believed to be beyond the term of normal labor. In 232 cases the child was born alive and in sixty-one cases stillbirths resulted, one died on the fourth day of hemophilia. In analyzing the causes of the latter we find that it is usually difficult to trace the same. Craniotomy done in one case. The average weight of the babies in these contracted pelves at the time of delivery was 6 pounds 6 ounces.

Spontaneous labor was reported in twenty-nine cases. Operative delivery was resorted to as follows: low forceps, five; median, four; and high, six; version with breech extraction, five; simple breech extraction, two; Cesarean section, one; craniotomy, one. Among the spontaneous labors there were twenty-seven children born alive and two dead; among the operative deliveries, seventeen alive and six dead. It is in this class of cases that the induction of labor before term is of particular interest and the method comes in direct contrast with the production of Cesarean section at term. A series of factors must be taken into consideration in deciding which method is productive of the best results. As the patients referred to in this investigation were confined within the city limits where hospital facilities were at hand, the question assumes a different aspect from what would occur in country districts where such facilities would be missing or difficult to obtain. It would appear from the above statistics that the deciding factor in this class of cases is not easily gauged. The environment of the patient and the facilities which the doctor may employ, play a large part in the final outcome. In view of the uncertainties attending any estimate of the size of the child and the relative proportion of the fetal head and the maternal pelvis, the issue must always remain in doubt in comparison with letting the patient go to term and into labor. The previous history of the patient if she is a multipara cannot be accepted as a deciding factor, because women who have had Cesarean sections for their first babies on account of a contracted pelvis may readily give birth to subsequent children in which the head is smaller or more readily molded. It would appear, therefore, that the personal equation is the most important thing in deciding the outcome of such cases and in view of the facilities extended by our modern hospitals it would appear as if the average patient with a contracted pelvis could be allowed to go to term and given a subsequent test of labor in each instance.

Fibroids, ovarian cysts and other neoplasms in the pelvis or generative organs furnish the indication for induction of labor in three cases. As we have no series of similar cases to compare these with in which labor produced without interference, no further attention can be paid to this particular class. The same objections might apply, however, to the induction of labor before term where tumors are more or less in the way of the advancing fetus as have been noted for contracted pelves. Especially where the pelvic tumor complicates the pregnancy the estimation of the size of the fetus may be difficult, but as we know that in many instances a movable tumor can be pushed out of the pelvis by the contractions of the uterus, it would appear reasonable in all such cases to await the onset of labor before resorting to artificial methods of delivery.

Constitutional conditions as an indication for the induction of labor were noted in eighty-nine cases, including heart disease in nine cases with five living and four dead children reported; tuberculosis three cases, two living children and two dead children (twins); toxemia fifty cases with one maternal death and twenty-eight living children (twins twice) and twenty-four dead children; eclampsia nine cases with no maternal deaths, four living and five dead children; nephritis nine cases with eight living and one dead child; pyelonephritis three cases and three living children, accidental hemorrhage three cases with two living children; meningitis one case, living child, mother dead.

In the above compilation it is difficult to distinguish between toxemia, eclampsia, and nephritis as the reporters in most instances failed to specify the details. Grouping them together under the heading of the toxemia of pregnancy we find a total of sixty-eight cases treated by induction of labor with one death among the mothers and thirty deaths among the children. Considering that in a great many cases we were dealing with premature infants, this is a fairly good showing. Among the severer types of toxemia which are included under the heading of eclampsia and in which it is presumed that convulsions were present, we find the number of fetal deaths in nine cases as five, or somewhat more than 50 per cent. This total number of cases is, of course, too small to warrant any definite conclusions as to the value of the conservative methods of terminating toxemias of pregnancy, although the fact that only one mother died out of sixty-eight is worthy of note.

Fetal factors as indications for the induction of labor were noted in 118 cases, including the following: excessive size of child (including overtime gestation), sixty-two; hydramnios, five; placenta previa, twenty-eight; monsters (including hydrocephalus), one; premature rupture of membranes, seventeen; dead fetus, five.

Regarding the method employed for inducing labor we find that dilating bags were employed in 244 cases (Voorhees 240, Pomeroy four) almost to the exclusion of all the other procedures. Gauze packs are mentioned in ten instances. Bougies and gauze were used in six cases, gauze and bags in twelve cases, bags, gauze, bougie and manual dilatation in nine cases, gauze and manual dilatation in one case, manual dilatation alone in three cases, rupture of membranes in five cases. It is rather difficult to obtain any definite estimate as to the time required before the onset of pains as the state of the cervix undoubtedly varied greatly in these cases. In thirty-five cases, two bags were required, and in four cases, three bags. We find, for example, that in one case the pains began within a half hour after the insertion of the bags and in another forty-eight hours elapsed before the pains came on. It is also interesting to note that although in several instances there is no record of any labor pains, the cervix dilated with bags or gauze readily up to as much as four fingers, when rupture of the membranes and the administration of pituitrin completed the labor. Regarding the character of the pains, we find that in many instances they were irregular and again that they often ceased after the expulsion of the bags.

In the cases in which the dilating bags were employed the personal equation of the operator seems to play an important part. In some instances the bags were evidently left in for prolonged periods until expelled, in others a fresh bag was inserted as soon as a dilatation corresponding to the previous bag had been secured. In a very few cases the first bag failed to elicit pains and was supplemented with gauze packs and sometimes rupture of the membranes and manual dilatation. One reporter refers to the frequent use of strychnia and quinine administered at intervals when the bag was introduced but no estimate of their value as oxytoxics is given. Compared with the other cases in which no drugs were employed the results seem about the same. Pituitrin was not mentioned except in a few cases when the cervical dilatation was practically complete. In one case even 2 c.c. of pituitrin failed to have an effect as far as producing uterine contractions was concerned.

In the cases in which the gauze pack was employed the results seem to have been delayed and as a Braxton Hicks version was done in a number of these cases it is impossible to pass judgment on this particular procedure. It seems, however, that with the gauze pack dilatation of the cervix often occurred without the production of actual pains.

In 293 cases in which labor was induced it was necessary to resort to an operative delivery in 135 instances including forceps seventy-eight times, version forty-five times, craniotomy two times, breech extraction twelve times, Cesarean section once. The child is reported as being born alive in 232 cases, including fifteen living twins and stillborn in sixty-one cases, including one twin stillborn. Twelve children lived for only short periods. The weight and development noted in 255 instances showed the average weight to be 6 pounds 6 ounces. Asphyxia was noted in only a few cases, the inference being that respiration was spontaneous in the remainder.

Regarding the question of lacerations and hemorrhage the data are insufficient for definite conclusions although where noted the hemorrhage was described as slight or moderate and in no instance did any real postpartum hemorrhage occur except in cases of placenta previa. The lacerations of the cervix and perineum are limited to slight or first degree tears, except one instance of third degree after version.

Regarding the question of temperature we find fever about 100° F. recorded in twenty-seven cases after delivery. In only two cases was a temperature noted before the induction of labor. Puerperal sepsis was stated to exist in two cases, one of which died on the twelfth day after version for placenta previa. From the comparatively small number of cases with temperatures it is probable that the induction of labor by conservative methods did not result in any infective process sufficiently severe to produce a definite rise of temperature. In the cases where temperature was noted, operative delivery or some form of intrauterine manipulation aside from the insertion of the bags was employed. No conclusions as regards subsequent temperatures can be drawn from the manner in which labor was induced.

Among the other complications noted which might be attributed to the insertion of the dilating bags were the following: prolapse of the cord and hand, two cases; prolapse of the cord alone three cases; and a change in position once from a vertex to a transverse, and once from a vertex to a shoulder. In none of the other cases were these abnormalities noted. In one instance a third degree perineal laceration resulted but this must be attributed to the delivery by version and breech extraction.

END RESULTS AS REGARDS MOTHER AND CHILD.

The series of cases herewith noted is very deficient in this respect for in only eighty-five instances was the reporter in a position to note the condition of the mother and child at the expiration of a year or longer. Among the eighty-five cases thus noted, a physical examination was reported in only a comparatively small number, but the general statement refers to the fact that the mothers were alive at the end of this period and in no instance was the genital or constitutional condition present attributed to the induction of labor. The details of these cases in so far as they were obtainable are presented in the previous list. Among the eight-five cases which it was possible to follow up for a period of a year or longer, fifty-three babies were reported as alive and well. One died during the first year of summer complaint, ten died soon after birth from various causes, including two hemophiliæ. In two cerebral hemorrhage was mentioned and in the remainder no direct cause was given but the prolonged labor was probably a factor. There were twenty stillbirths in this series. This makes a total of eighty-six babies including one case of twins.

CONCLUSIONS.

In summing up the results of this inquiry your Committee is obliged to acknowledge that the same is not fruitful of satisfactory results. It would appear that the results of the induction of labor for the conditions noted are excellent as regards the mother and in no instance could either the maternal death or any other effect be attributed to the process. As regards the fetal life it is not possible to draw definite conclusions. Among the cases stillborn or dying soon after birth a reference to the record will show that the operative delivery contributed as much to this as any other factor. In the toxemia cases prematurity naturally played an important part, although we find that even in some of these cases the babies survived.

One lesson to be gained from this endeavor is that very much more definite detailed information is essential before conclusions can be drawn, which would permit of comparing the conservative delivery of a woman for the conditions enumerated with those of a more radical operative character, including accouchement forcè, vaginal, or abdominal Cesarean section.

DISCUSSION.

DR. L. EMMETT HOLT, in opening the discussion, by invitation, said: The subject of the ultimate results in medicine is one in which I think we are all greatly interested. Too much of our work both in private and hospital practice consists in taking care of acute conditions after which patients pass from our observation; what happens ultimately is what we would all like to know.

I have no statistical material to present to you. It is impossible for any one following children in private practice to get a sufficiently large number of cases coming under this head to answer definitely the question propounded.

There have been great advances in the last ten or fifteen years in the care of the premature and delicate child. When I look back at the results which we get now and compare them with those of even ten years ago, I am amazed that we could have contented ourselves to care for those children as we did then.

At the present time I think that a baby of 6 pounds 6 ounces—which I understand to be the average weight of the cases reported in the paper—provided he is in good condition at birth, does not usually give the pediatrist very great trouble. A baby who at birth weighs 6 pounds 6 ounces, we feel is a good risk, and with proper care such a child ought not only to survive the first year but to come through it in good condition. Recently we have been steadily lowering our age viability. At the Babies' Hospital we regard a premature baby who is admitted in good condition weighing 4½ pounds as a fair risk. Anything under 4 pounds we do not claim much for, although we have seen a number of children below 3 pounds get on extremely well; that is, with exceptional care carried on for a very long time.

The thing which concerns us most in the treatment of these cases is to establish maternal nursing. On no account where nursing is possible should one allow a mother to stop nursing and attempt artificial feeding. If that is done with a baby at 5, 4½, or many at 6 pounds, the difficulties are enormously increased. It has been the general opinion of the obstetricians with whom I have talked that there has been a marked increase in the amount of maternal nursing during the last fifteen years. But I feel the profession generally is too ready to advise weaning from very slight and often insufficient reasons.

One of the chief difficulties we meet in treating these small babies in a hospital, where the mothers are not received, is in devising some means of keeping up the secretion of the mother. If by nursing another infant the mother can keep her milk up for a few days at home, she is then able to come to the hospital and nurse her baby. In most instances after four or six weeks she can take the child home and continue nursing. If the case has not been well handled and the mother loses her milk and she attempts artificial feeding at the end of a month or six weeks, the results are most unsatisfactory. I think the question then resolves itself into the kind of care and feeding the infants get at home. The profession is only just beginning to appreciate that many women are able to nurse who formerly were discouraged from nursing, and from very slight symptoms they were told, "Your baby isn't doing very well and you had better take it off the breast." Such advice is heard every day as having been given to dispensary and hospital patients. The vital importance of breast feeding for the patients we are considering should be impressed upon the doctors and on the students that we are teaching.

It is very difficult in a discussion like this to separate in our minds the facts as we see them with the results which might be expected if all these cases had proper attention. That is really the question that we ought to consider, not what has happened, but what ought to happen, if these children receive good and proper care.

My belief then is that a baby weighing 6½ pounds who has not received any injury during the delivery and whose mother did not suffer from any form of toxemia, if in good condition, ought to be successfully reared in almost every instance.

Too much importance cannot be placed upon the early care of the child especially during the first month. There is sometimes expressed by pediatrists a feeling that in this critical period the infant under the care of the obstetrician does not receive the attention that his needs require, and that better results would be obtained if the pediatrist could take charge earlier.

Great changes have taken place in our view of feeding babies during the first month. I think that nearly everyone here has given up nursing every two hours. There are a great many other things, too, that might be referred to, and there are minor considerations which come in, but if the obstetrician could hand the baby over at the end of the month in as good condition as he found it, plus the extra pound that the child ought to have gained with the nursing mother, I think that the rest of the year would be tolerably secure. It is the first month that usually decides the first quarter, and the first three months that decide the first year.

I feel very hopeful of results in the care of babies when we see what has been done in New York largely through the work of the Health Department. In 1888 the infant mortality in New York was 288 per 1000 of infant population, in 1902 it was 168, while for last year it was but 95 per 1000. This represents a saving in Manhattan and Bronx of pretty nearly 300 per cent. If all that was accomplished was just to pull those infants through the first year, there would be an increase in the deaths of the second year. This is not the case. The reduction in infant mortality in New York last year was about 480 over the preceding year. But the reduction over two years was nearly twice as great. The same reduction holds true in the deaths from one to two years and two to five years. We can assert that infant deaths prevented during the first year are not simply deferred to the next year.

Of the infant deaths which occur during the first year, 33 per cent. occur in the first month, 22 per cent. in the first week, and 13 per cent. on the first day of life.

In conclusion, it is I think very hard to discuss this question simply on the basis of the number of children who die unless we also take into account the time at which they die and the cause of death. The deaths during the first two days are usually from causes which are largely beyond our control such as early prematurity, accidents of labor, malformations, hemorrhages and other conditions related to delivery.

DR. G. L. BRODHEAD said: It is very hard to discuss a paper of such a broad aspect as Dr. Kosmak's because it seems to me that in order to properly discuss these cases we ought to have them divided up into periods of seven, seven and one-half, eight, eight and one-half and nine months, and we ought to discriminate between end results in patients and children in private work from the results of patients in hospital work.

We all realize that a child of 6 pounds 6 ounces at eight and one-half months is very much more likely to live than a child of seven or eight months weighing perhaps the same amount and I think that in order to discuss the question of end results we ought to classify these cases with reference to hospital, private, period of gestation, cause of interruption of pregnancy, operative interference, etc. I have no figures as I had not time to review my histories before coming here, but as I look back upon the induction of labor at eight, or eight and one-half months, it seems to me that the vast majority of the infants have done very well.

DR. HOLT spoke of the obstetrician's care of the child during the first month of life. We use our utmost endeavors to get patients to nurse but it is amazing to see how many women there are who are unable to nurse satisfactorily in spite of everything that we can do. My experience may be a little different from the experience of pediatrists, but it seems to me that if the patient does not nurse satisfactorily during the first month she is very unlikely to nurse satisfactorily after that time. I have had any number of patients who continued to nurse hoping that when they were able to be up and about the milk would be of larger amount and better quality, but with rare exceptions, if the patient has not done well during the first month it is unlikely that she will do well subsequently. While we agree with Dr. Holt that breast feeding is absolutely the best thing for the child, I do think, from the standpoint of the obstetrician, that a good many of these babies who continue at breast nursing for a month are required to nurse for entirely too long a time after they are referred to the pediatrist. I have seen any number of instances where I felt certain at the end of three or four weeks that the child ought to go on a bottle, but I have kept up the breast nursing and supplemented it with modified milk and have seen some of these babies continue for weeks at the same weight with unsatisfactory breast nursing, and I am confident that some of those babies at least would have done better on modified milk. We should, and do realize the great importance of breast feeding, but in my experience, if the child is not doing well, it is not advisable to defer the use of modified milk too long.

Dr. Dickinson, of Brooklyn, said: There are inductions and inductions. I would recall to the Society the professor of obstetrics who showed us how to induce labor. He first used a metal dilator, modified in his clinic. Under anesthesia he injected between the uterus and membranes, an ounce or two of glycerine, then a bougie was pushed in, after that he placed a bag of his own invention in the cervix; then he followed that up by packing the vagina thoroughly and then sent the patient away for a good dose of castor oil. It might be called a polyclinic induction.

I confess to being a heretic. Dr. Lusk said to me once, "when I am five years older and ten years braver I think I shall be willing to induce every primipara at eight and one-half months." When I get brave enough I shall do it. I am fond of castor oil and quinine, with membrane stripping and two fingers' dilatation two weeks before term, in primiparæ. Here are fifty-eight of my inductions. It seems to me that the Committee's list is too small for this Society to publish; that if the Committee should be continued and if they are willing to do some more grind, we will get a series that will be worth while.

At this point in the discussion Dr. Dickinson referred to the extensive use of the Voorhees bag in the large institutions in New York and went on to say that he believed the simplification of it ("pulling on the tail of it without pulling off the tail of it") and the cheapening of it had put in into the armamentarium of so many men that there is a great number of cases in which it has been used. Continuing he said: I think, too, that the rectal tube has a large following. In other words, with a little drumming I am sure we can get a much larger series.

I would like very much to hear from Dr. Holt a few of the details as to how the modern treatment of prematurity differs from the old one. We all asphyxiated our babies in the old days in incubators, and most of us have come to simpler methods. We would like to hear from him as to whether he forces feeding.

DR. C. W. KOSMAK said: I believe that this committee should be continued and that a paper be not formally published until we obtain some further data from the members of the society. The fact that Dr. Dickinson has come to the fore with his cases may animate some of those who haven't yet contributed to send in their quota.

Undoubtedly there are many phases of this matter that can be gotten at if more time is spent on this series. As it is, some of the reports didn't come in until a few days ago and I didn't have time to go over them.

I would like to say for Dr. Holt's benefit that a baby weighing 6 pounds and 6 ounces is hardly a fair criterion to judge these cases by, as quite a number of babies weighing 9 to 10 pounds were delivered, which brings up the general average. No details were given as to the toxemia cases. Very few of these were labeled eclampsia and I suppose those were the cases in which the convulsions were present, so the report is rather unsatisfactory in that respect. We have no information as to the variety of toxemia present. It is rather a relief, I think, to find that none of the operators advised either drugs or dilating instruments to induce labor. In a few cases castor oil was noted as having been given, and in two cases a dilator was used to start the dilatation, after which a bag was inserted.

DR. F. R. OASTLER said: Mr. President, I didn't know that we were to have the privilege of asking Dr. Holt questions. If that is so I would like to ask him along the line that Dr. Brodhead has already mentioned.

My experience with regard to the modifying of mother's milk as to quantity and quality has been similar to that mentioned by Dr. Brodhead and I would like to ask him two or three questions along that line. One is, What methods does he follow, for instance, in changing both quantity and quality of mother's milk—proteid, starch or fat as the case may be? I would also like to ask him about another thing that seems to be very important to my mind, and that is, How much is there in the question of inheritance in children? In other words, if we have a nervous mother, don't we get a nervous child? If we have a mother who suffers from hypochlorhydria and all the associated nervous symptoms, are we not apt to get a child of nervous constitution? Also if the gastric digestion in the mother is impaired if we do not often have the gastric digestion in the child considerably weakened? It seems to me that with nervous parents I get the same condition in my children. The child has difficulty in its digestion and it seems as though inheritance really plays a definite part in the matter. I would like to ask Dr. Holt if such has been his experience in these conditions; also with these children if we persist with the mother's milk in spite of obstacles such as green stools and the like, whether possibly we are not doing the best we can under the circumstances, and if the child is past the three month's period (which seems the period where they really make a change for the better), are we not better off to continue with the breast milk rather than change to modified cow's milk. Or is it better when we find the breast milk is not agreeing to make the change early to cow's milk before the digestion is badly upset and the digestion further weakened thereby when a change to cow's milk will be still more difficult.

Dr. L. E. Holt, in closing the discussion said: In the first place, regarding the treatment of the premature child. For six or eight years at least we struggled with the small incubator and came to the conclusion that it had two very serious objections which seemed almost insuperable. The first one was the danger of asphyxia; we always needed a cylinder of oxygen at hand with which to revive the patient. Then there was the constant danger of infection and the difficulty of maintaining a uniform temperature. Becoming discouraged with results we gave up the small incubator. Then we began to keep premature infants in a moderately warm ward with a temperature of between 70° and 75° and tried to maintain the body heat by the use of electric pads and hot-water bottles. This was an improvement on the results with the closed incubator, but was not satisfactory. Several years ago in the Babies' Hospital a special room was constructed for the care of premature children. This room is about 12 by 16 feet and 10 feet high; it has double walls, double partitions and double windows; a special duct for the intake of fresh air which goes above the roof of the building. This air is warmed by passing over a coil of pipes and it then comes into the room. There is a special ventilating apparatus consisting of an electric fan placed in a duct. This room has been in use for six years and has proven most successful. One of the principal causes of failure with these very small infants is infection. We insist that nobody shall enter the room except the person absolutely concerned with the care of the children; also that they be disturbed as little as possible. The room accommodates six infants giving each one about 300 cubic feet of air. Ordinarily we do not have over five patients at one time.

A temperature varying from 88° to 90° seems to agree best with these children for the first two weeks; it is then gradually lowered to 80° or 85°. Before being sent home the children are put in another room with a temperature of about 75° where they are kept for a week or so.

For food they usually receive breast milk entirely for four or five weeks, after that frequently mixed feeding. It does not seem necessary that the milk should be the same age as the baby. We have had women feeding these premature babies successfully whose children are eight and nine months old and it seems to make no difference. In the beginning we dilute this milk with a solution of one part of breast milk to two parts of water or barley water. The amount of one feeding at first is usually from 2 to 4 drams. They are fed every three hours. An effort is made to have them take the breast as early as possible. This is usually successful in the third or fourth week, often earlier. We have saved a number of children under 3 pounds' weight. We admit few who weigh as much as 5 pounds. Many when brought are so feeble that they die in a few hours. They come in all kinds of conditions. Once a man came in with one in his inside coat pocket, and another one in his outside pocket wrapped only in brown paper.

Regarding the care, we thought at first that a trained nurse was indispensable, but found it hard to continue her interest for an indefinite time. Now a nursery maid fills the place and it is most gratifying to see the interest that she takes in her work. In fact, we really have to drive her out to get sufficient fresh air. Such care and nursing has much to do with the results obtained.

A point in the successful treatment of these patients which I think cannot be too strongly insisted upon is the absolute necessity of keeping out of this ward everybody who is suffering from an infection. If a nurse gets a cold in her head she is displaced. I do not think we appreciate how often infections are carried to these patients by mothers or nurses. In them the dangers of otitis, bronchitis and pneumonia are very great, and even a cold in the head may be the beginning of serious or even fatal illness. I believe the provisions made in most of our obstetric hospitals for the care of the babies are grossly inadequate; overcrowding is most dangerous.

Question.—Do you oil your premature infants?

Answer.—This is the routine practice. We do not bathe them but endeavor to handle them as little as possible.

The question has been asked what principal mistake the obstetrician was likely to make in infant feeding. It seems to me it is overfeeding. This is I believe true with all who feed children artificially.

I agree with what Dr. Oastler and Dr. Brodhead have said regarding many women who cannot nurse. My own contention was that many physicians do not persist as they should in their efforts to make a woman nurse.

The question of inheritance of feeble digestion has been raised. I think there is much in inheritance that we must recognize. I do not think, however, that there is as much in it as a patient of mine who said her baby was obstinately constipated, but that was to be expected as the father was always so. The nervous make-up of the parents certainly has much to do with the baby. We are just beginning to realize how much the nervous system of the baby has to do with its progress. These constitutional conditions are most difficult to deal with. One of the great problems of the present day is the nervous child of the nervous mother and sometimes conditions are exaggerated by the existence of a nervous father also.

TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

Meeting of December 10, 1914.

The President, George Erety Shoemaker, M. D., *in the Chair.*

Dr. John Osborn Polak read a paper on

A CRITICAL STUDY OF THE CLINICAL SIDE OF TWILIGHT SLEEP FROM AN EXPERIENCE AT THE LONG ISLAND COLLEGE HOSPITAL.*

Dr. Richard C. Norris.—I am very glad of this opportunity to say how much we appreciate this very conservative paper of Dr. Polak. I think the profession, as well as the laity, is not quite sufficiently informed in the modern method of "twilight sleep." The necessity for ether in the second stage of labor at the acme of suffering, is evidence that the woman is not *wholly relieved of pain.* Two important problems are presented, first: What are the dangers to the child and in what ways, for example by prolongation of labor, may it interfere with the woman's welfare. In my own experience, going back some years ago when we used morphine and scopolamin and doubled and tripled the dose of morphine along with the scopolamin for the relief of pain during labor, a series of observations were made at the Preston Retreat, and I found the labors prolonged and the proportion of asphyxiated, stillborn babies increased. The paper of Newell of Boston influenced me to try this method. After an additional experience in which morphine alone was used, to produce a lesser degree of narcotism and relief from pain, similar unfortunate ill-effects on the child and prolongation of labor were noted. I believe the time has come for us to educate the public that *forgetfulness,* not relief of all pain, is the aim of "twilight sleep," and to accept this line of treatment in *certain classes* of cases as Dr. Polak has said. It seems to me that it is not necessary in a large group of multiparous women who do not approach their labors with this tremendous anticipation of suffering. Some of you know very well how you have to hurry to the house to get there in time to deliver many of these women. In many multiparous women the first stage of labor may go on for hours without intense suffering. You see this in a strong robust woman with a good nervous system. That element in a woman's makeup counts most for her in her delivery. Ether analgesia and the judicious use of pituitrin in this class is a practical substitute for "twilight sleep." But when we come to the hyper-

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* See original article page 721.

esthetic primipara, the girl raised in the lap of luxury whose nervous system cannot stand the strain, whose uterus refuses to act, and who, when she falls into labor, is almost hysterical at the approach of suffering, I believe this method of "twilight sleep," carried out with strictest detail to minimize its dangers, will be a blessing. I believe it is time for our profession to recognize its possible dangers as well as its full merit and by ceasing to antagonize it try to stop the wholesale advertising it is receiving at the hands of department stores and vaudeville circuits who use its exploitation for commercial reasons. It is not true that, as there claimed, a woman who is going to have a baby may without possible danger go to sleep and forget it, if the doctors can be forced to use it. It is unwise, unnecessary and impractical to attempt to use this method in all cases, and practically to apply it at the bedside. As Dr. Polak has said it is essentially a hospital treatment and demands observation from the moment you start the narcotic until the patient is safely delivered. Who of you engaged in general practice with a large obstetric practice on the side, can spend hours and hours in constant observation of your patient and feel that you are properly paid for it. The type of patient whose nervous equipment for labor is defective is suitable for this treatment and may receive it with benefit. Such cases can usually be recognized before they fall into labor. The man not willing nor able to give the necessary time could pass such a patient into the hospital. This would be a distinct advance in obstetrics. We are hearing constantly that not only safe labor, but now painless labor, is best to be had in the hospitals. This means a growing call for more maternity hospitals, and a higher plane of obstetrics, and I welcome this phase of the subject; I welcome this growing popularity among the laymen of hospital obstetrics. If the truth about "twilight sleep" can be crystallized from this wholesale advertisement, and the doctors as well as the public may definitely know its possibilities and its dangers, it will be of some value to lessen the suffering of women and do much for successful obstetrics.

DR. BARTON COOKE HIRST.—I have tried this method twice. Once as far back as 1903 when it first appeared, and again a few years later, each time in a series of about 100 cases. I tried it again for the third time quite recently, and I am sorry to say that I cannot agree with my friend Dr. Polak in his conclusions. If you noted carefully what Dr. Polak said you will remember that he quoted Prof. Gauss to the effect that the average dose was 1/6 grain of morphia. I was interested to hear that, because I got that admission out of Gauss myself with some difficulty. I made the rounds of his hospital with him and tried to pin him down as to the average dosage. He finally admitted that the average dose was 1/6 grain and that 1/4 grain was about the maximum amount given during the whole course of labor. Nobody who has practised obstetrics will believe that a quarter of a grain of morphia will rob a woman of the pains of labor. I had an amusing illustration last week of something said to me by the late William Pepper at the time osteopathy first became a fad in this community. I was rather shocked on one occasion to find that Dr. Pepper had actually referred a patient to an osteopath. He told me that it was not wise to antagonize too violently the many fads and fancies that periodically crop out in medicine. That applies, I think, particularly to this last proposition. I had last week in one of my hospital services two patients in private rooms. I announced to both that I was going to give them the "twilight sleep." They told their friends and families who were delighted. One of these patients was amenable to suggestion and to the fake element, which is a large part of this treatment, and I managed to persuade her that she was not having much pain. The other patient was a college graduate with a mind that could not be so easily impressed. I had given her a quarter of a grain of morphia and two doses each of $\frac{1}{120}$ of scopolamin. The room was darkened; there was not a sound. I said to her quietly, "Isn't this wonderful; you are in the midst of the "twilight sleep"; you are not having a particle of pain; you are not suffering at all." "The devil I'm not," said the woman, "I'm having more pain than I ever had." I then gave her ether, and made her comfortable. In the University Maternity I had to discontinue morphia and scopolamin because there were too many cases of postpartum hemorrhage, too many cases in which forceps had to be used, too many asphyxiated babies. So I am not an enthusiast for "twilight sleep." At the same time I am willing to give the treatment, if the patient is an impressionable one, and I should carry the treatment out just as Gauss does with small doses and much suggestion. Dr. Polak did not dwell upon one phase of the question as he might have. I made the rounds of the hospital with Gauss, and with that dictatorial manner of the German professor, he stopped at each bed and said, "You have not had any pain in your labor, have you?" The patient didn't dare to say anything but "No." That question, I dare say, was addressed to every patient every day, and by the time she left the hospital with the disposition of every woman to forget the pains of labor, she had had no pain. The method is not so popular around Freiburg as might be imagined. One American lady living on the outskirts of the town became pregnant and promptly left for home because, as she said, she was not going to have this treatment in view of what she had seen of it and heard about it. Of course we have all given morphia to parturient women. There are certain cases with a slow, painful first stage in which restless, nervous individuals will do very well on one dose of morphia; but, to systematically narcotize a patient to actually abolish the pain of labor by morphia and scopolamin is, to my mind, too dangerous to be pursued as a routine practice. In individual cases it is all right. As a routine practice, those of us with most experience must condemn it. You may remember that this was the opinion of four of us when consulted by Mr. Bok, the editor of the Ladies Home Journal, last June—DeLee, Whitridge Williams, Green and myself. When Mr. Bok came to see me he intimated that my opinion was the one he most wished to have, and I presume the other gentlemen were approached in the same way. If you will remember, every one of us agreed perfectly in our opinion of this method. Three of us had been to Freiburg and all of us had tried it.

DR. DANIEL LONGAKER.—I want to express my very great appreciation of this very valuable contribution, and to say that, on the basis of nearly 100 cases observed recently, and not many years ago, I feel that I can confirm every statement that has been made by my friend Dr. Polak. I cannot agree with my friend, the last speaker, that there is a large element of fake in this method of treatment. This I do not believe after having results which to my mind are increasingly satisfactory, and in spite of the adverse opinion that has just been expressed by Dr. Hirst, I feel that I shall continue with increasing satisfaction the use of these drugs in the induction of "twilight sleep" according to the Freiburg plan.

DR. BROOKE M. ANSPACH.—I am glad that after the fifteenth of this next month the railroad fares to Brooklyn will be increased; otherwise, if the laity becomes advised of Dr. Polak's brilliant work, our patients would leave us and go to him. His presentation of the subject has been most able, and deserves our hearty endorsement.

I think that in the majority of cases of labor, certainly after dilatation of the os, we will agree that ether is a very satisfactory form of anesthesia; but, in a long-drawn-out first stage when the woman has painful but inefficient uterine contractions, we have all wished for something more, the case in which the woman asks you every few minutes whether you cannot do something for her, and every member of the family in turn appeals to you for help, until at last, in many cases, the poor doctor is driven to interfere. To such unwise interference are due most of the disasters attending labor when there is not a serious disproportion between the head of the baby and the pelvis of the patient. Therefore, in such instances, if the method proves itself of value, there will be a very large field for it. During the last three months, Dr. Piper and I have tried to carry out this plan of "twilight sleep" at the Philadelphia Hospital. The maternity building is rather well adapted to it, being at some distance away from the street and the other departments. Noise has been eliminated so far as possible, the room has been kept darkened, and we have endeavored to carry out the ideas of Krönig and Gauss. There is no doubt that a patient can be carried completely through the normal case of labor without any remembrance of it. We have had that demonstrated. In one case in which I was particularly anxious to try morphia-scopolamin narcosis, the contractions were very painful and very inefficient, and the dilatation of the os was very slow. In this instance it failed. Possibly we gave too large a dose. I shall benefit by the information Dr. Polak has given us in the future. I think the method deserves great attention and should be given the most careful consideration, especially in patients with painful but inefficient contractions during the first stage of labor.

DR. GEORGE M. BOYD.—I wish personally to thank Dr. Polak for what I have learned from his report of the work at the Long Island College. Pain is the greatest enemy of man and it is the privilege of the doctor to relieve pain. This I think we have been doing for a long time. If in labor we wish to call relief from pain, "twilight sleep," I think we have for a long time been carrying out this method. The advocates of the treatment claim that it should not be instituted until there are pains of five-minute intervals. As the patient has had many pains before that stage, it seems to me that we can hardly obliterate the knowledge of them. We have used morphia for a long time as the greatest of all drugs for the relief of pain and many of our patients are unconscious of the greater part of the pain of labor. To eliminate the suffering of the first part of labor would seem to me to be the refinement of obstetrics, we might say, the art of obstetrics in contradistinction of its science. Had we the personality, the charm of our guest and the force which he exercises over his patients we might produce a "twilight sleep" with less drug dosage. The personality is, I believe, an element of considerable force in the control of pain. Pain is a mysterious thing. Not every woman has intense pain through the greater part of her labor. Only a certain proportion of these patients have the nervous system disturbed to any great extent. This is proven in the fact that the patient's condition is good after delivery. We must keep in our minds the complications. It is apparent also that such treatment can be carried out only in the hospital.

DR. JOHN A. McGLINN.—We are very much indebted to Dr. Polak for his clear and conservative presentation of this subject. The thing that has impressed me most in the subject of "twilight sleep" is the wonderful publicity which can be attained by advertising. It is an unusual thing to meet the women who does not want to discuss with you this subject. The articles which have been printed in the popular magazines have, however, conveyed to the lay mind a very erroneous impression of this subject.

It is a general belief that "twilight sleep" solves every question of obstetrics, that every case can now be carried through without pain or danger and that a woman is able to resume her ordinary occupation in twenty-four or forty-eight hours after delivery. It should be impressed upon the patients that all that "twilight sleep" does or can do is to make them forget the pains of labor. It does not reduce the various complications of pregnancy.

It has no effect upon the toxemias, the faulty presentations, the contracted pelves, or the infections. The greatest good that this agitation can do is to bring the patient closer to the physician.

I would suggest that it would be a much wiser thing if the "philanthropist" who is sending women to lecture upon the advantages of "twilight sleep" would instruct them to educate the women to seek medical advice early in pregnancy, and seeking such advice should demand from their medical attendant, a proper study of the pregnant state. The belief upon the part of the physicians and the laity that pregnancy and labor are purely physiologic processes and consequently require little or no thought, is a very dangerous one.

It is true that the majority of cases are physiologic, but unless all cases are properly studied from the beginning of pregnancy we will never find and in many cases prevent those complications which mean death or morbidity to the mother and babe. So that while I do not deplore the publicity of "twilight sleep" or its advantages, I feel that the efforts of the profession and the laity could be expended in more profitable fields.

Dr. Swithin Chandler.—There are four statements that I desire to make. First, I have seen two deaths in less than 100 cases in which scopolamin was used in dosage approximating $\frac{1}{33}$ grain. Second, I have seen also many cases, two in particular, in which there was a very great deal of excitement, in one case six people being necessary to control the patient. Third, I do not think any one should use the method unless they are perfectly willing to stay by the bedside of the patient during the entire time. Fourth, I think Dr. Hirst is to be congratulated upon his very clear presentation of the matter.

Dr. William R. Nicholson.—I came here tonight as a learner. I have been asked, as doubtless has every physician in this room, as to the benefits of "twilight sleep" and whether or not I believed in the method. Up to this time I have hedged, and it depends upon how Dr. Polak conducts himself in his closing whether or not I shall continue to hedge. I do not claim to know anything about it, although some one has said that we have been using this method. I have given morphia in labor, but one or two doses of morphia at any time during labor is not "twilight sleep." As I understand this matter, the advocates of the method are claiming that they are presenting an entity in obstetric management. There is a certain method of carrying out this plan, and if we do not carry it out as typified by the work of the Freiburg clinic we have no right to compare our results with theirs. I have talked with two or three men who are in this audience tonight who tell me that they have used the method. It is not, however, "twilight sleep," according to Dr. Polak or according to the literature of the subject. While I do not say that I am a believer in the method at this time, I am convinced that it is our duty to try it out even if we finally discard it.

Dr. J. Thompson Schell.—My experience is limited to forty-seven cases. Personally I feel that in this method we have something really good, and if properly applied, many women can be saved much suffering. It is all right to talk about hypnotizing people, but you can't hypnotize a woman in labor. I agree with the last speaker that the drug inside the hypodermic syringe does the business. I feel under personal obligations to Dr. Polak for presenting this subject. I think he knew about what he would get when he came here—and he got it. Dr. Norris, I think, deserves great credit for his very fair discussion. Let us give the method as fair and partial a trial. It is no credit to the medical profession of Philadelphia to call a new method a fake just because it didn't originate in Philadelphia. I never agree to give my patients the "twilight sleep." I simply contract to deliver them by the safest and most humane method possible, and if at the time of delivery I feel it justifiable, I use scopolamin in sufficient dosage to produce the so-called "twilight sleep," and the more I use the method, the better

I feel toward it. It is not a panacea for all obstetrical ailments, but in proper hands, it is an addition to our present technic.

Dr. Polak, closing.—My paper did not get as much unfavorable criticism as I had expected it would, for which I thank you. It does us good to have such a skeptic as Dr. Hirst put himself on record in regard to this method. It always encourages us to be more careful and specific in our future observations. The trouble is that most of the men who went to Freiburg, did see a method used there known as the Siegel method, which was introduced as a last resort in an effort to simplify and popularize "twilight sleep," and which is quite a different scheme from the technic of Krönig and Gauss. Some of those babies were certainly alarming pictures. Little attention was paid to their appearance; however, they were put over on a side table and in two, three or four minutes the babies would take a few breaths and cry. That the results were unsatisfactory in a large percentage of cases done by this method is admitted by the men who stayed there long enough to see it tried out. There were a number of the profession who stopped off in Freiburg on one train and took the next out, who are freely expressing their opinions on "twilight sleep," and who when they came home, tried this method of Siegel and got much the same if not worse results than were gotten there. It is employed only in their third-class patients and it is not the method that Gauss himself uses. I had under observation in Freiburg two private cases whom I had confined before and had seen go through labors such as you have all witnessed in highly nervous women. I watched these women through their labors showing every outward evidence of severe uterine contractions, by grimaces, restlessness, contractions of their hands, turning over on the side and drawing up their legs, and I was there when they came out of their *amnesia* with no recollection of pain and astonishment that they had been asleep for ten or twelve hours. If we sit down beside our patients after we have given the hypodermic of morphia and talk to them to allay their restlessness just as we would in giving ether, they go under the influence of the drug more rapidly—this is not hypnotism, but confidence. There is no definite analgesia, but there is amnesia. The morphia is only given to put the patient into the same condition of mind as the patient brought to the operating room who has been given the pre-operating dose of morphia and hyoscine. In regard to deaths from the method, we have carried one woman along for twenty-one hours, during the first stage and the maximum dosage has been 0.75 of a grain in twenty-one hours. Success or failure depends largely on experience. They tell me now that it is not necessary with the present drugs to use such large doses, and that the same effect can be secured with one four-hundredth of a grain that used to be secured with one hundred and fiftieth and two-hundredth. My assistant tells me that he can get the same result with a third less dosage and carry the patient longer than he formerly could. There is no question that the method cannot be successfully applied outside a hospital. We have got to have some one who is willing to put in the time, watching the woman, and watching the fetal heart. You cannot direct a nurse to give a dose of scopolamin and morphia and then repeat it in two hours. That baby will go bad if the time is close to the end of the first stage of labor, or the woman will say, as Dr. Hirst's patient did—"No, this this is—ah—not 'twilight sleep' at all." It is distinctly a first-stage procedure. In Freiburg they are particular not to use this method within two and a half or three hours of the expected termination of labor. Many of our cases are ambulance cases and when I came home we wanted to get as many cases as we could. It was from that source that we got our first series of babies, and here I had two of my most serious asphyxias in my desire to get a painless labor. I am glad that Dr. McGlinn pointed out the importance of the whole project, that we should educate people to the fact that "twilight sleep" is *not applicable to every woman who has a labor pain.* When asked by patients whether they can have "twilight sleep" we should reply that we will give it if in our judgment it is best for the woman and the child. In our out-patient department, our private and general hospital work, it is bringing people to us for antepartum examinations and to know whether they are all right for "twilight sleep." One phase not touched upon is the value of the method in heart cases. We have had three serious cases of heart disease, all three of the same type, cyanotic and dyspneic, with the physical signs of decompensation, who after being given the second dose were able to lie down and had no recollection of the labor. They had a quick second stage with forceps and did better than any other heart cases I have ever had in obstetric work.

I want to thank you all for the privilege of being here and for the courtesy you have extended to me this evening.

Dr. Richard C. Norris, read a paper on

THE USE AND ABUSE OF PITUITRIN.*

DISCUSSION.

Dr. John O. Polak, of Brooklyn.—The views expressed in Dr. Norris' paper accord so well with our practice in the use of pituitrin, that I can but endorse them. I do believe, however, that the profession should be warned of danger of this drug, when it is used for conditions outside of the safety zone. It has definite indications and limitations and is never wholly free from danger, unless the soft parts are practically obliterated, the head and pelvis approximately normal and the attendant ready to allay the excessive contraction should it occur, with ether. Two cases of ruptured uterus in a year has been the toll paid for its indiscriminate use in Brooklyn. This warning is the greatest lesson I can leave with you.

Dr. George M. Dorrance (by invitation) read a paper on

THE TECHNIC OF BLOOD TRANSFUSION WITH THE SYRINGE.†

Dr. Alfred Heineberg read two short papers.‡

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* For original article, see page 741.

† See original article, page 754.

‡ See original articles, pages 747–751.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OBSTETRICS AND GYNECOLOGY.

Regular Meeting, Held January 26, 1915.

DR. GEO. W. KOSMAK *in the Chair.*

DR. M. RABINOVITZ reported a case of

DOUBLE OVARIAN INGUINAL HERNIA, ABSENCE OF THE UTERUS, AND A RUDIMENTARY VAGINA.

Report of Case.—Mrs. E. Z., thirty-five, married six years, nullipara. She had never menstruated. Her chief complaints were: amenorrhea, inability to have proper coitus, and sterility. On questioning the patient more closely as to her sexual relations, she stated that copulation was carried on by urethral intromission, and that her husband does not seem to be aware of any anomaly in her sexual structure. Physical examination showed a small, lean woman, with a moderate scoliosis of the upper dorsal region, of fair complexion, and apparently fair health. Heart and lungs were negative. Axillary hair wanting. Mammary glands small, flabby but feminine in type. Abdomen: normal to percussion and to palpation. Pubic hair abundant. Labia majora and minora well developed. Clitoris of normal size and appearance. Urethral orifice (Fig. 1) is represented by a longitudinal slit, surrounded by a rim of hypertrophied mucosa resembling miniature labiæ. It readily admitted the index-finger without causing any pain. She has full control of her bladder and suffers from no urinary disturbances. The vagina was represented by a blind pouch, lined with a smooth mucosa, of 1½ to 2 inches deep. This depth could be increased to almost 3 inches by a slight upward pressure with the examining finger. The introitus vaginæ was wide enough to admit two fingers, but was lax, as if it possessed no sphincter. Vaginoabdominal and rectoabdominal palpation failed to reveal the presence of either a cervix or a uterus. In each inguinal region, at the site of the external inguinal ring, a semisolid, irregular, reducible tumor was seen and felt (Fig. 2). The right was the size of a large walnut, the left about twice as large as the right, but more cystic in consistency. The reduction of these masses was not complete, for they reappeared as soon as the pressure was released, irrespective of the position that the patient had assumed. At no

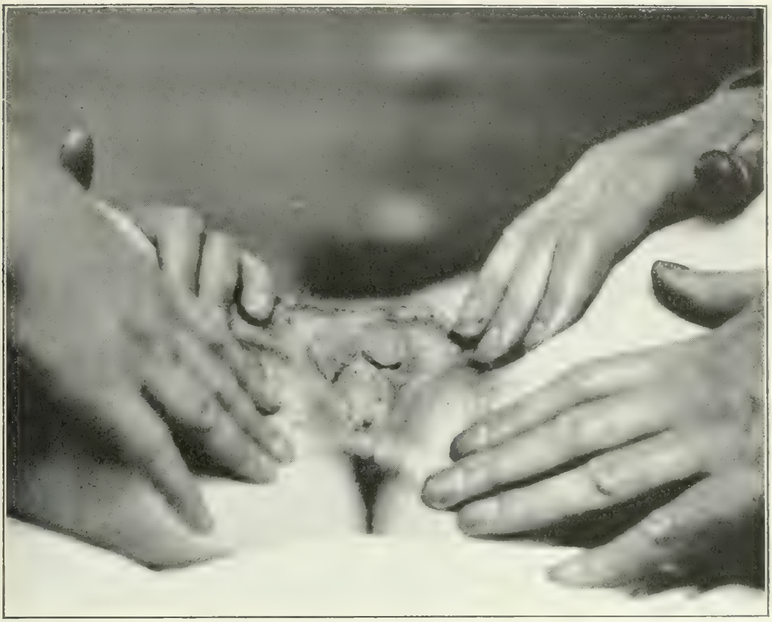

FIG. 1.

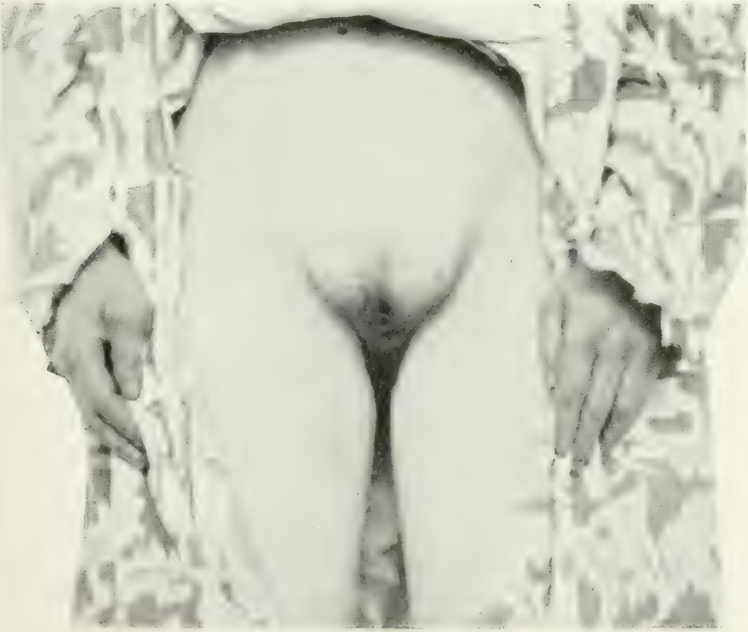

FIG. 2.

time did she notice any periodic changes in the size of these tumors, nor have they ever caused her any pain.

Diagnosis.—The physical findings furnished the data for diagnosing the case as one of congenital absence of the uterus, a rudimentary vagina and, in all probability, a double ovarian inguinal hernia.

Operation.—On November 8, 1914, I performed celiotomy through a Pfannenstiel incision. On exploring the pelvic cavity, the following facts were ascertained: (*a*) That there was a complete absence of the uterus; (*b*) that the Fallopian tubes were of fair size, measuring from 3 to 3½ inches in length. Their inner ends fused in the median line, forming an ovoid-shaped thickening about the size of a lima-bean (Fig. 3); (*c*) both ovaries were well developed, the left one contained a corpus luteum cyst, as large as the right ovary; (*d*) both ovaries with parts of the fimbriated ends of the tubes protruded through the external inguinal rings, forming the herniæ. The ovaries could be easily dislodged from their peritoneal pockets, but would jump back into place as soon as released from the grasp of the palpating fingers. Having oriented myself as to the anatomical conditions of the generative organs, I resected the cystic portion of the left ovary, closed the abdomen in layer sutures, excepting the skin; and then performed a bilateral hernioplasty. The skin was now closed, and the patient made a complete recovery. I did not attempt to improve the already existing vaginal tract, for an experience in two previous cases, and the knowledge obtained from the literature has taught me that no matter whatever modus operandi I might have employed, the result would not warrant the additional operative risks attending the formation of a new vagina. For my patient was in possession of a cavity lined with mucous membrane, measuring

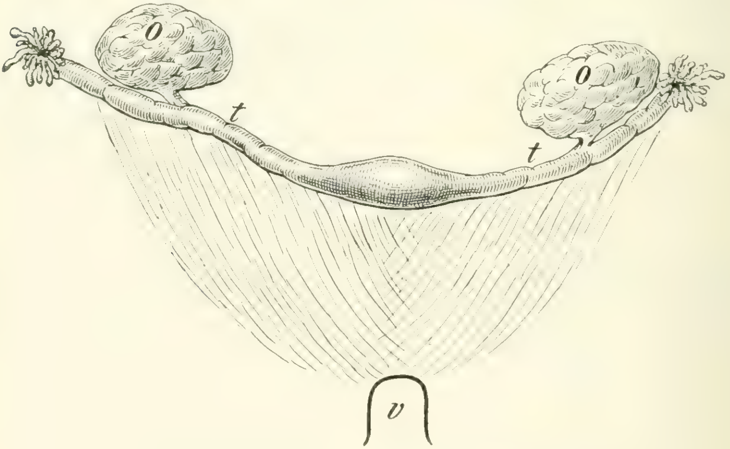

FIG. 3.—*o*, ovary; *t*, tubes; *v*, vagina.

about $2\frac{1}{2}$ to 3 inches in length, and, judging from the history of this case, it ought to satisfy her male companion, who seems to have been gratified till now with a much smaller hiatus; the urethral orifice.

Dr. H. Vineberg asked what was the operation called for in the report of his first case. Was there a hernia present or not.

Dr. Rabinowitz replied that there was no hernia present.

Dr. Vineberg said that he was interested in the fact that there was possibly something lost sight of—it was very rare to find that the ovaries were absent. He did not believe that there was one authentic case reported in the literature where the ovaries, in such cases, had been absent. He recalled one instance where the abdomen was opened and a search made for the ovaries. Later, at the postmortem, ovaries were found high up and just below the kidney. It was rather rare to find them low down. The report of Dr. Rabinowitz cases were of great interest because both the ovaries came down. It has been assumed that the dilatation of the urethra was the result of coitus through the urethra. As a matter of fact the urethra was dilated resulting as a part of the malformation. Coitus occurred because the urethra was naturally dilated in these cases.

Dr. A. H. Harrigan said that he was very much interested in what was said regarding patients who had pelvic kidneys and he did not know how frequent such pelvic kidneys were associated with such conditions.

Dr. Henry D. Furniss recalled an instance of a pelvic kidney occurring in the service of Dr. Ward and the only one that showed any changes. The vagina was found but the uterus was absent. The tubes and ovaries were not discovered at first in the pelvis and might not have been discovered at all if further and careful search had not been made.

Dr. Rabinovitz, closing the discussion, said that the case reported was his first one of this nature, and he was, therefore, unable to state how frequently such conditions were associated with pelvic kidney.

THE CLINICAL SIGNIFICANCE OF AMENORRHEA IN THE DIAGNOSIS OF TUBAL PREGNANCY.*

Dr. M. Rabinovitz read this paper.

Dr. Vineberg asked why it was deemed necessary to remove so many ovaries; he found that it was seldom necessary to remove them and he felt that it was always better to save them.

Dr. Rabinovitz said he was very glad that Dr. Vineberg had called attention to conservation in regard to the ovaries in cases of tubal pregnancy. His first case showed that at Beth Israel Hospital normal ovaries are never removed, for the specimen consisted of the pregnant tube only. It would however be folly to attempt to conserve ovaries that were densely buried in adhesions and chronically

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* For original article see p. 766.

inflamed as demonstrated by the other specimens, in which both the tube and the ovary had to be removed.

Dr. A. H. Harrigan reported a case of

OVARIAN CYST WITH TORSION OF THE PEDICLE IN A CHILD TWELVE YEARS OF AGE.

This patient whose family history was negative was admitted to the Fordham Hospital, December 24, where she came under his care. She was twelve years and six months of age. The family history was negative. She had had scarlet fever when two and one-half years old, and tonsillitis every winter for the past six years. There had been no similar attacks previous to that time. The present illness began four days before admission with abdominal pain and vomiting. The vomiting was frequent and the pain was persistent. It was quite sharp in character and was more intense in the left iliac fossa. The mother stated that the urine had been cloudy for the past two days and that urination seemed painful. The bowels were regular.

Examination showed the patient well developed and well nourished. The tongue was coated. The heart and lungs were negative. The abdomen was symmetrical and not distended. There was rigidity of both recti, most marked in the lower abdomen, and especially on the left side. There was tenderness in both lower quadrants, but particularly on the left side. No mass was palpable. The liver, spleen and kidneys were not palpable. Rectal examination revealed a definite mass in the midline. A second rectal examination, made when the patient was narcotized, showed that the mass was movable, situated behind the uterus, and seemed as large as a good sized orange. The patient's temperature was 99.8; the pulse ranged in frequency from 74 to 20; respiration 24. The white blood count was 15,000 with 78 per cent. polymorphonuclears. The urine was cloudy, specific gravity 1032, acid; no albumin or casts. It contained a few leukocytes, pus cells, and red blood cells.

A definite diagnosis was not made. Owing to the acute onset with abdominal rigidity and tenderness, coupled with the presence of a mass, an exploratory operation seemed indicated.

In discussing the case with the staff immediately before operation, Dr. Harrigan stated that three diagnoses were possible: Acute appendicitis, with a secondary pelvic abscess; tuberculous peritonitis, and a cyst or sarcoma of the ovary.

Under ether narcosis the abdomen was opened through a median hypogastric incision. There was considerable free clear fluid in the peritoneal cavity. A mass was found lying between the rectum and uterus. It was easily delivered and seen to be a cystic tumor the size of an orange. It sprang from the left broad ligament and its pedicle had two complete turns passing from left to right. The tumor was absolutely black in color, in fact, almost gangrenous. It was easily removed in the usual manner. The appendix was examined and found negative. The uterus was quite small while the right ovary was large and congested but not cystic. The abdomen was closed without drainage.

The patient was discharged to-day having made a complete recovery.

In 1911 Rudolf Haubert published a thesis in which he collected 200 cases of ovarian tumors in children under fifteen years of age. According to age they occurred in the following frequency: In the fetus, six cases; new-born, ten cases; first year, eighteen; from two to three years, fourteen; from four to five years, six; six to seven, seventeen; eight to nine, fifteen; ten to eleven, nineteen; twelve to thirteen, thirty-seven; fourteen to fifteen, forty-nine. In 175 cases in which the pathological classification was given it was as follows: Dermoid, fifty-nine cases; cystoma, nineteen cases; cysts, fifty-three cases; hematoma, four cases; sarcoma, twenty-four cases; carcinoma, twenty-three cases; cystic carcinoma, five cases; cystic sarcoma, four cases; endothelioma, four cases. This showed that malignant tumor occurred in 34 per cent. of the cases analyzed by Haubert. He did not mention the occurrence of torsion of the pedicle in any case.

Pathologist's Report.—The specimen is described as follows: Ovary is 7 cm. in length by 3.5 in thickness by 4 cm. broad. The lateral and medial surfaces are smooth. The whole organ is of greenish-brown color. The mesovarium is thickened. On section the organ is of mahogany color, contains several cysts about 2 mm. in diameter, some containing a glue-like substance, others a fluid. The whole organ is firm in consistency. Section of the mesovarium is the same color. The tissue of the mesovarium is honeycombed with tiny cysts. At the extremity of the mesovarium appears a small Fallopian tube, apparently in good condition except for the hemorrhagic infiltration which involves it as well as all the other tissues. Microscopical examination shows practically the whole field obscured by hemorrhage. A few isolated areas which permit study show infoldings of their walls, the lining cells are completely absent, the cavities contain large quantities of blood. Such stroma as is visible is edematous, and its blood-vessels are markedly congested. There is no evidence of fibrosis It may be concluded that the condition is one of cystadenoma complicated by hemorrhage into the stroma and into the cystic cavities.

Dr. Vineberg said that four or five years ago he was called in to see a girl, nine years of age, on whom was made a diagnosis of appendicitis. She had had pain, vomiting, and a high temperature. Her abdomen was rigid. There was no difficulty in mapping out a large tumor which reached beyond the umbilicus. A diagnosis had been made of a cyst with a twisted pedicle. The operation was performed at night. The tumor proved to be a cyst with a twice twisted pedicle. This patient made a good recovery. This case was interesting to him because it brought to mind that they all should bear in mind that young people were not exempt from such a condition.

Dr. Hiram N. Vineberg reported a case of

EARLY INTERSTITIAL PREGNANCY.

Mrs. F. C., thirty-two years of age, married thirteen years, the mother of four children, the youngest being three years old, was admitted to the Har Moriah Hospital on December 19. She had had no miscarriages. The menses made their appearance in the sixteenth year, and were of the four weekly type, lasting five days. About eight hours before admission to the hospital she was suddenly seized with severe abdominal pain, radiating to the right shoulder. The pain was felt most severely in the right iliac region. With the onset of pain the patient vomited, felt chilly and faint, and was covered with clammy perspiration. On admission it was surmised that an intraperitoneal hemorrhage had taken place, but there was some doubt of this as the patient gave no history of an irregular menstruation. Her preceding menstruation had occurred just four weeks before, was regular as to amount and as to time, and there had been no spotting. She was seen shortly after admission by Dr. Henry Roth, the Attending Surgeon, in whose service she had been admitted. He was unable to make a definite diagnosis and asked that the case be seen by the attending gynecologist. I was unable to make a definite diagnosis. The patient was short and stout and had a very thick abdominal wall, and the abdomen was very much distended and markedly rigid. It was with some difficulty that the uterus could be palpated. It appeared to be normal in size and position. The adnexa were not distinctly palpable. A misleading feature in the case was that the patient complained only of agonizing pain between the shoulders and seemed to be free from abdominal pain. This phenomenon made us consider the probability of spontaneous rupture of the spleen with consequent intraperitoneal hemorrhage, or a perforation of a gastric ulcer. Still, the greater probability seemed to lie in a ruptured tubal pregnancy, and the case was referred to Dr. Vineberg for operation, which was performed within a few hours after the patient's admission to the hospital.

On opening the abdomen it was found filled with fluid blood so that it spurted out with some force as soon as the peritoneum was cut. On passing the hand down to the adnexa on one side and bringing them into view they were found to be normal; the same was done with the adnexa on the other side and they also appeared to be normal. The uterus could not be brought into view, owing to the thickness of the abdominal wall and the short broad ligament, but there was nothing suspicious about it so far as palpation could determine. The only source for a hemorrhage that could be found so far was a ruptured corpus luteum in the left ovary. It began to appear that the source of the hemorrhage was not after all in the pelvic organs, but before giving up it was decided to make an ocular inspection of the uterus in its entirety. The incision was extended down to the pubic bone and the uterus brought into view. We then discovered a small vascular elevation not as large as a kidney bean in the right horn of the uterus where the tube entered it. It was so insignificant in appearance that the assistants thought, at first glance, that it was the result of a perforation by a sound, but the soft villous tissue protruding from it left no doubt as to its true nature. The area was excised and the resulting wound in the uterus sutured, after removing most of the blood from the peritoneal cavity. The abdomen was sutured in the usual manner. The patient made a rapid and satisfactory recovery and was discharged on the tenth day after the operation.

The interesting features of this case are: (1) The absence of any irregularity in menstruation, the menses having occurred four weeks before and were due only on the day of the onset of the illness. (2) The unusual situation of the pain when the patient was examined in the hospital. The pain was so intense that the patient screamed with agony on any attempt to change her position yet it was referred solely to the back in the dorsal region. (3) The ease with which the source of the hemorrhage could have been overlooked. In a somewhat similar case in a prominent city hospital a few years ago the attending surgeon with considerable experience in gynecological work, after making what he considered a thorough search for the source of the hemorrhage, gave it up and closed the abdomen. The patient promptly died, and at autopsy a condition was found not unlike that present in this case. It was the recollection of that incident that prevented our giving up the search in this instance, until the entire uterus was brought into view and inspected.

Dr. Hiram N. Vineberg also presented

AN UNUSUAL CASE OF ADENOCARCINOMA OF THE UTERUS.

Mrs. M. R., aged twenty-eight years, married at fourteen, widow for three years, was admitted to the Mount Sinai Hospital, December 8. Her family history was negative regarding tuberculosis and cancer. She had three children, the youngest three years old. The menses began at the age of thirteen years and were regular, of the four weekly type, and lasted from four to five days. She had always enjoyed good health, but for the past four months the menses had been prolonged, lasting ten or eleven days. The patient's general condition was good. The uterus was globular, uniformly enlarged, corresponding in size to that of the gravid organ at about eight weeks. It lay in retroversion but was freely movable and easily anteverted. A diagnosis of fibroid growth, probably of the submucous variety, was made. Owing to the youth of the patient, it was decided, if feasible, to incise the uterus, enucleate the fibroid, and then suture the uterine wall, thus conserving the uterus and ovaries. At operation, on December 11, the uterus was found in retroversion, and corresponding in shape and size to that found on bimanual examination. On bringing the uterus up to the abdominal incision, it was noted that the surface was slightly rough and presented a deep reddish color. This was looked upon as due to passive congestion, owing to the malposition of the organ. The anterior uterine wall was incised longitudinally and the effort at enucleation of the submucous growth was proceeding successfully when a portion of it broke down and some grayish friable material presented. It still made the impression of a degenerated fibroid, but one of the staff of the pathological laboratory who was present, suggested that it might be a malignant growth. On closer inspection this supposition seemed well founded and a total hysterectomy was performed.

The microscopical examination made by the pathological laboratory showed the growth to be an adenocarcinoma.

The patient made an uneventful recovery and was discharged from the hospital on January 2.

The points of interest in the case are: (1) the early age of the patient; (2) the absence of a flow or discharge in the intervals of the menstrual periods, (3) the evident rapid growth of the tumor, (4) the impossibility of making a correct diagnosis from the symptoms and local findings.

This latter brings up an interesting point in reference to *x*-ray treatment for fibroid tumors, and constitutes to my mind one of the strong arguments against its universal employment, as advocated by some.

Dr. Emily Dunning Barringer read a paper on

ACUTE TRAUMATIC DISPLACEMENT OF THE UTERUS.*

DISCUSSION.

Dr. Hermann Grad said that these traumatic displacements were rather rare and when a retroversion is encountered it is difficult to say that the displacement occurred at any particular time. It was interesting to note that Dr. Marion Syms was the first to call attention to traumatic displacement of the uterus, and the observations of that case led him to the invention of the Syms' speculum. By the use of the instrument he raised the posterior wall of the vagina, and air would enter and assist in the reduction of the displacement of the uterus.

There were two important points to consider in these cases, first, the condition of the bladder, and second the condition of the perineum at the time of the injury. If the bladder is distended at the time of the accident, it would push the fundus of the uterus toward the sacrum and one could readily see how under these conditions intraabdominal pressure would become a factor in the uterine displacement. The condition of the perineum, is also of importance. Whenever the intraabdominal pressure is increased, like in coughing or sneezing the perineal muscles contract automatically and give support of the pelvic floor and the contents of the pelvis. During traumatism these synchronous muscular actions

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* For original article see page 758.

do not take place and, therefore, their actions are not effective factors in preventing dislocations of the pelvic organs.

Dr. A. H. Harrigan said that, it seemed to him, the condition was extremely rare and he could not recall an instance where any traumatism caused a displacement of the uterus.

Dr. Abraham J. Rongy said that the symptoms which may be due to a traumatic displacement of the uterus are subjective in nature and the physician has no means of ascertaining as to the validity of these complaints. Personally I believe that the diagnosis of traumatic displacement of the uterus should never be made unless the patient had been examined before the accident and a change in the position is discovered immediately following the accident. Many a woman who consults us about primary sterility has the uterus extremely retroverted or retroflexed and complains of no symptoms whatsoever. Simple displacements of the uterus very seldom cause symptoms.

From an anatomical standpoint an acute displacement of the uterus is almost impossible unless the accident is accompanied by severe injury to the pelvis and I would be unwilling to ascribe any form of acute displacement of the uterus to an accident which is not accompanied by a severe pelvic injury.

Dr. Frederick C. Holden of Brooklyn believed that those girls or women who had not borne children and complained of symptoms in the lower part of the abdomen following an accident, did not have the symptoms ascribable to traumatic displacement of the uterus. He recalled the case of a girl who sued and recovered $30,000 because after an accident she could not hold her urine. She got a verdict in her favor and now she was much improved. He could not see how trauma could cause a displacement of the uterus; this organ had enough leeway to float; and even though displaced he could not see how it could give place to symptoms under such circumstances. All who had examined cases with sterility in women usually found an anteverted uterus with the cervix absolutely in the hollow of the sacrum and the patients complained of no symptoms whatsoever. They merely did not conceive. Dr. Holden said he was unwilling to take the ground that the uterus displaced itself by any sudden fall or jerk. What had been offered he believed to be a rather dangerous assumption.

Dr. Barringer, closing the discussion, said that she had not intended to imply that she had made a physical examination in these cases before the time of injury, but had relied upon a careful history of the accident and physical findings after the accident. She believed that her cases had been in good health as regards their pelvic organs before the accident, and afterward they were not. Two of the cases had previously been patients, and had never complained of pelvic trouble. Both of these cases were completely disabled immediately after the accident. One, a school girl, was unable to stand erect because of the intense pain, in this case the uterus snapped easily into place, and remained there, and all painful symptoms disappeared at once. Dr. Barringer said further that to consider all uterine displacements due to external trauma would be absurd, as the vast majority of uterine displacements arose from other causes. In the course of ten or twelve years' experience in examining accident cases she had found many cases of retroversion and prolapse which she had not reported as traumatic in origin. She supposed the three medicolegal cases reported in her series, had been found in the course of about 150 such medicolegal examinations. Dr. Barringer stated that she is much interested in these cases and realized that because of the element of litigation it is difficult to study them and obtain correct statistics.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Regarding the Active Principle in the Ovaries and Placenta.—Hermann (*Monatschr. f. Geb. u. Gynäk.*, January, 1915) presents an extended experimental study in which he attempted to isolate an active principle in the ovary principally from the corpus luteum. He isolated as the carrier of this activity a yellow oily substance which hardened on cooling but otherwise remained thick. A well-marked cholesterin reaction could be elicited. Contact with the air turns it brown, evidently due to the absorption of oxygen. This substance is made up of three elements; carbon, hydrogen and oxygen, of which the carbon forms about 81 per cent. and the hydrogen 11 per cent. This body is a cholesterol derivative soluble in alcohol, ether, petrolether, acetone and benzol, but insoluble in water. Hermann also isolated a similar active principle from the placenta and found with a single after-birth content a larger amount of the active principle than in a corpus luteum. With this substance the author made a series of experiments in rabbits, for the details of which it is necessary to refer to the original article. He found that the active principle thus isolated from the corpus luteum and placenta exerted a well-marked stimulating influence on the growth and development of the entire genital system, especially as regards specific sexual characters. He believes that this active principle provides for an anatomical integrity of the genital apparatus and the mammary glands. It also influences the changes in the genitals which are characteristic of the early stages of pregnancy. A series of detailed colored plates are included to show these changes.

The Glycogen of the Uterine Mucosa.—Aschheim (*Zentralbl. f. Gynäk.*, January 30, 1915) believes that the deposit of glycogen in the uterine mucosa of the sexually developed woman is a physiological process and stands in close relation with the anatomical changes of the mucous membrane during menstruation. In the glands of the postmenstrual period during the first half of the interval, glycogen is absent. The increased secretory activity of the latter days of the interval is accompanied by the appearance of glycogen in the glands of the mucous membrane in addition to the albuminoid excretion. In the stroma cells glycogen is also found in the premenstrual stage and likewise in the superficial layer of muscles. During menstruation the glycogen is extruded together with the mucus and only in persistent premenstrual glands can it be demonstrated after menstruation ceases. If pregnancy ensues both the glands and the stroma cells retain their glycogenic activity. Regarding the significance of glycogen in this connection, the author distinguishes two varieties. One is found in epithelial structures and cartilage, that is to say, in tissues which are poorly supplied with circulation, and secondary, the glycogen found in the liver and muscles, in which it is deposited or used up according to the nutritional conditions and activity of the subject. During pregnancy glycogen undoubtedly represents a nutritive deposit in the glands and the decidua which affords the young ovum nutrition. The author also suggests that in cases of sterility without any demonstrable cause, it might be of interest to test the mucous membrane during the premenstrual stage for its glycogen content.

The Cholesterin Content of the Blood.—Huffmann (*Zentralbl. f. Gynäk.*, January 16, 1915) presents the results of her observations in a series of pregnancy and gynecologic cases from Krönig's clinic. The colorimetric method of Autenrieth and Funk was employed as this required only 2 c.c. of blood. The author found that the cholesterin content of the blood increased during pregnancy from its normal value of 0.15 per cent. to about 0.06 per cent. on an average. The increase reaches its maximum during the last month and the normal condition is restored in from eight to ten days independent of whether the patient is nursing her baby or not. The blood from the umbilical cord shows a pretty constant value of from 0.11 to 0.12 per cent. This does not depend on the cholesterin content of the maternal blood. In eclampsia even higher values were found. The menstrual process does not apparently influence the cholesteral curve. The latter shows a well-marked increase in the course of a narcosis and a diminution in all malignant tumors, especially when there is a well-marked anemia or cachexia present.

Salpingolysis for Sterility.—Goullioud (*Ann. de Gyn. et d'obst.* July, 1914) believes that the large number of operations and treatments of the lower genital organs for the correction of sterility are comparatively without result, and that the cause generally lies in the internal genitals, especially the tubes. In most cases an early abortion or a gonorrhea has sealed the tubes and caused the sterility. If the lesion is unilateral and only one tube is affected pregnancy will occur after medical treatment of the organs; but if it is bilateral the condition is much worse. The author has seen eleven cases of pregnancy after emptying unilateral pelvic collections of pus, two cases after ablation of the adnexa unilaterally with ventro-fixation, and one after removal of pyosalpinx by vagina. Bilateral lesions often occur in very young women. The author presents the history of a new case operated on by separation of adhesions and opening of the tubal extremity by a process which he calls salpingolysis, followed by pregnancy. Unfortunately the ovaries are often so diseased that there are no ova extruded to enter the tubes. In the author's case pregnancy occurred two years after the operation.

Abdominal Retention of an Ectopic Fetus at Term.—A. Fruhinshols and G. Michel (*Ann. de gyn. et d'obst.*, July, 1914) details the history of a case of ectopic pregnancy in which the gestation went to term and then was mistaken for a delayed normal delivery. The patient became infected and the cervix was dilated by balloons before it was found that the fetus was not *in utero*. The resulting operation was fatal, the child being already dead. The evolution of pregnancy was without incidents, appearing perfectly physiological. At the end of the first month there was a flow of blood which probably coincided with an emigration of the fetus from the tube to the abdominal cavity. It then developed quietly. There were false labor pains. The uterus was large and folds within simulated fetal parts. The woman was deeply debilitated and infected when operated on and died.

Relations between Gestation and Cancer of the Breast.—J. L. Faure and A. Pinard (*Ann. de gyn. et d'obst.*, July, 1914) say that there is absolutely no literature with reference to the relations between gestation and cancer of the breast because of the extreme rarity of the condition. The authors during forty years of service have seen but two cases of gestation occurring in a woman having cancer of the breast. The authors recount the history of a case in point showing the action of gestation on the progress of the cancer of the breast. The patient was a woman of thirty-two years, who suffered from infantile paralysis at the age of eleven months, so severely that up to ten years of age she was unable to walk or use the right hand. After using crutches many years, operations were done to stiffen the left ankle and right knee so as to enable her to support herself without crutches. She remained a virgin to the age of thirty-two, when the cancer of the right breast had already begun to grow. She then became pregnant. During the pregnancy the growth increased rapidly and involved the pectoral and axilla. The child was delivered normally. Before delivery the tumor was removed with the pectoral and masses in the axilla. At the time of writing both mother and child remained well. Here we have a cancer developing during two years, the evolution of which was much more rapid during pregnancy. In another case observed by the authors in a woman of twenty-eight years of age, who had a small tumor of the breast in the sixth month of gestation, the tumor grew enormously after labor, became generalized, and the patient died. Another woman of thirty years died six months after labor of so-called acute cancer of the breast. The authors conclude that every tumor of any kind occurring in the breast before gestation should be extirpated as soon as possible after the beginning of gestation, and as radically as possible.

Relative Placental Insufficiency.—Antonio Ridella (*Ann. di. obst. e gin.*, Jan. 31, 1915) divides intrauterine deaths into three groups: first, those who die within the first three months of pregnancy; second, those dying from the third to the ninth month; third, those dying about the time of labor. A large proportion of the fetal deaths occur within the first three months and death is a frequent cause of abortion. The causes of death at this period have to do with local conditions within the uterus or in the ovum, which hinder the fetal development, or cause deficiency of or altered feto-maternal interchange. After the third month death of the fetus occurs less frequently the later the period of pregnancy. At this period the relations between mother and child are closer, and the development of the fetus acquires a certain importance in the general functions of the maternal organism. In this period constitutional diseases of the mother, such as syphilis, albuminuria, and cardiopathies most influence the development of the fetus. Less frequently local causes in uterus or ovum are operative. At the time of labor the causes of death are conditions of the uterine muscle, which by too strong or prolonged pressure forms an obstacle to the fetal circulation; or a change in the continuity of the circulation from fetus to mother; or obstruction of circulation in the umbilical cord. The author analyzes and discusses a case of fetal death at labor observed by him, in which the placenta was carefully examined microscopically. The placenta was found to be one-third smaller than usual. There was also alteration of the placental structure that lessened the circulation to a rather large fetus. The author concludes that the activity of the placenta depends not on the number of the functional elements, but on the activity of those elements. A relatively small placenta will permit of life and perfect development if the elements are all active. The modifications of structure of the placenta in the author's case confirm the value placed by many writers on the special functional activity of the placenta in the early months of pregnancy. To the causative factors of intra-uterine death at the time of labor may be added a special condition of the placenta which permits development of the fetus up to the time of labor but becomes insufficient to continue the life of the fetus when labor begins and to carry out the circulation of the fetus during the act of delivery.

Production of Abortion and Labor by Use of Placental Extracts.— In the course of efforts to determine what may safely and efficiently be given to patients who fail to go into labor at term, it was decided by A. H. Curtis (*Surg. Gyn. and Obst.*, 1915, xx, 292) to employ subcutaneous injections of whole blood derived from healthy puerperal patients. In one case labor pains occurred but ceased in a few hours; a second patient failed to respond, and a third had severe pains. Toxic effects were not observed, but it was decided to discontinue the work until experiments upon animals had been performed. These showed that extract of human placenta in normal salt solution is oxytocic for pregnant guinea-pigs and rabbits. Defibrinated blood from pregnant and from puerperal women (which contains some placental material) possesses similar properties in a lesser degree. Defibrinated blood from non-pregnant women appears not to disturb pregnancy in guinea-pigs. The same is true of normal salt solution. Extract of guinea-pig placenta in normal salt solution seems to be slightly oxytocic for pregnant guinea-pigs. No noteworthy influence was exerted by blood from pregnant and puerperal guinea-pigs.

Ovarian Tumors in Pregnancy.—In reporting a case of ovarian fibromyoma which had undergone myxomatous degeneration, the tumor weighing 292 grams, W. C. Danforth (*Surg. Gyn. and Obst.*, 1915, xx, 319) says that ovarian tumors are not particularly common during pregnancy, but enough cases are on record to make it essential that they be systematically looked for. Operation should be done as early as possible, preferably during the early months of pregnancy, the operation being demonstrated to be very safe for the mother and the danger of abortion begin but a fraction greater than the danger of abortion in the cases treated expectantly and less than the danger to the child in those allowed to go to term unrecognized. In case of complication, twisting of the pedicle, rupture of the cyst, or suppuration of the cyst, operation must be done at once.

Eclampsia and its Treatment. J. Oliver (*Practitioner*, 1915, xciv, 416) believes that the intoxication results from the intermediary and not from the end products of nitrogenous metabolism, and from the retention, primarily and more especially, of these intermediary products in the nerve and muscle cells, because there is an insufficiency of the requisite mineral substances circulating in the body of the mother to satisfy her own needs and those of her infant *in utero*. The avidity of the embryonic tissues transcends greatly that of the adult tissues as a rule, and this is true more especially of such important elements as phosphorus and calcium. Consequently, if there be in the circulating blood of the mother an insufficiency of any of the mineral substances, which are necessary for the maintenance of life and for the adequate fulfilment of the processes of metabolism, the claims of the fetus are paramount and demand to be satisfied if possible, even at the expense and to the detriment of the maternal organism. The oxidation of proteid matter in the organism takes place in intimate union with the phosphorus in the living cell; if, therefore, from any cause the phosphorus content of the maternal tissues, especially the nervous and muscular, becomes unduly lowered, then the formation of urea is hampered, and the intermediary products of nitrogenous metabolism are not evolved as they should be, but accumulate in the nerve and muscle cells. Independently of the autointoxication which thus results, the relative ratios of the mineral substances in the maternal cells become so altered, that the normal nerve and muscular reactions and irritabilities are changed, and convulsions are readily induced. The average diet of to-day is very deficient in phosphorus, and in calcium. In the cereal grains there is an abundant supply of both of these substances but the marketable flour of to-day contains little or no phosphorus or lime. The practice of polishing and coating rice has deprived this food stuff of much of its phosphorus and of other bodies which are indispensable to the maintenance of health. To safeguard the pregnant woman against eclampsia, we should ensure that her dietary contains an abundant supply of the mineral substances essential to her well-being. As soon as eclamptic convulsions develop, an attempt should be made forthwith to induce labor.

Permanent Enlargement of the Contracted Pelvic Outlet.—Many cases of dystocia due to contraction of the pelvis can be temporarily overcome by a limited increase in the diameter of the pelvic outlet. Many borderline cases could be permanently relieved by an increase of not more than 1.5 to 2 cm. in the conjugate diameter. It is possible to obtain this result by permanently spreading the pubic bones. This can be accomplished by the isoplastic transplantation of bone of a certain width to maintain the desired distance between the pubic bones, as F. D. Smith (*Med. Rec.*, 1915, lxxxvii, 569) has shown by animal experimentation. An incision is made over the symphysis. The dissection is carried down to the symphysis and the interpudic fibrocartilaginous tissue is completely removed, cureting the irregular nipple-like projections of bone on the surface. The bones are separated a certain distance by an instrument made for the purpose, as previously determined, and a transplant obtained from the internal surface of the tibia near its upper extremity is set in place. The transplant may be held in place either by grooves made in the pubic bones or by a heavy kangaroo tendon bound about the graft and pubic bones. After closing the incision with catgut a properly fitting plaster cast is applied. The progress and position of the transplant can be ascertained at varying intervals of time by means of the Röntgen rays.

GYNECOLOGY AND ABDOMINAL SURGERY.

Suppurative Salpingitis.—Maurice Auvray (*Arch. mens. d'obst. et de gyn.*, Nov., 1914) says that spontaneous opening of pyosalpinx into the bladder is rare. The author has operated on three cases, of which he gives detailed histories. In some cases there is no reaction at the time of the perforation to show that it is taking place. In others there is fever and pain. In the mild cases the appearance of the pus in the urine is the first sign of trouble. In others cystitis is also present. Symptoms of salpingitis have usually existed for some time. In a few cases the pus in the urine disappears temporarily, and the condition appears to have been cured; but this is not permanent and the pus reappears. The only sure cure for the condition is by operation. Cystoscopy gives valuable diagnostic points; without it exact diagnosis is impossible. The fistulous opening is generally on the posterior wall of the bladder and often concealed in a deep, craterform orifice. It may be of large size with pouting lips and an edematous condition of the bladder walls. There may be more than one communication between the abscess and the bladder. Intestino-vesical communications are not rare. The pouch may be drained by colpotomy, that is simple incision of the posterior culdesac with drainage; or by vaginal hysterectomy, the removal of the uterus giving plenty of room to operate on the sac itself. Another and better method is to open the abdomen, and drain the abscess, which may alone be sufficient to cause the healing of the fistula and sac. After hysterectomy it is advisable to remove the diseased adnexa, and suture the fistula in the bladder wall. This may not be necessary if it is small. Before the operation the patient should be put absolutely at rest in bed with hot douches, until the inflammation and tenderness are diminished as much as possible. The immediate results of the operation are good, and the remote result may be a permanent cure.

Primary Carcinoma of the Vulva.—G. Cattaneo (*Ann. di ostet. e gin.*, Jan. 31, 1915) gives us a study of twenty cases of primary carcinoma of the vulva. The most frequent point of origin of such growths was the labia majora; the next in frequency was the glands of Bartholin; third, the fourchette; last the clitoris. There were sixteen of the labia, four of the glands, three of the fourchette, and two of the clitoris. The predominance of the labia indicates the importance in etiological factors of irritation, not so much by coition as by development of areas of pruritus and consequent scratching. The disease was often preceded by an intense pruritus. There were no cases beginning in portions of the vulva not subject to irritation. The age of the subjects was rather advanced and at such an age syphilis is less frequent than in the young woman. There was not in any case a urethritis or vaginitis such as gonorrhea would produce. An ordinary leucorrhea and a lack of cleanliness seemed the starting point in most cases. In the treatment of these cases the author found surgical operation of most value. In some inoperable cases he found the *x*-rays of some value. Acetone is also a good deodorant and detergent in inoperable cases. In operation the labia should be removed and all the neighboring glands, pubic, inguinal, superficial and deep, iliac and obturator. The vulva should be completely circumscribed by the incision from the mons veneris, leaving the urethra. Drainage is useless. The glands at the sides of the rectum receiving the lymphatics of the glands of Bartholin must be removed at all hazards.

Uterine Prolapse with Associated Pelvic Relaxation.—C. H. Mayo (*Surg. Gyn. and Obst.*, 1915, xx, 253) says that for the cases of mild prolapse with retroversion or flexion without other intraabdominal complications, a simple Alexander operation on the round ligaments or some modification of the original technic has proved very efficient. With retroversion and descent difficult to replace because of probable associated pelvic lesions or other abdominal complaint, an intra-abdominal operation should be made on the round ligaments. If the cervix remains too far forward, the uterosacral ligaments or lateral folds of peritoneum should also be shortened to bring the uterus effectively to anteversion. The interposition type of operation is very efficient in the relief of partial uterine prolapse associated with extensive cystocele. If performed before the climacteric, it is advisable to divide and invaginate the tubes at the uterine horns to prevent any possibility of pregnancy occurring with such a misplacement of the uterus. The Kocher operation, or some modification of it, is occasionally made upon women in the forties—in which case the tubes are divided—but the method is usually reserved for women past the change of life with atrophied uteri. In deciding what cases may properly be treated by this method, if, when the cervix is grasped and pushed well up, thus restoring the vaginal position, the cystocele is thereby greatly reduced, the operation will probably be successful. The writer's operation differs from J. B. Murphy's only in that each half of the fundus is turned outward over the rectus muscle and beneath the aponeurosis to which it is secured by three mattress sutures on either side. The aponeurosis itself and the recti are now closed, and the aponeurosis over the cervical uterine tissue is again caught by two deep sutures to it. The abdominal wall is closed without drainage. For cases of the third and fourth degrees of prolapse, in patients between forty-five and sixty-five years of age, often with atrophy of the uterus and distention of the vaginal outlet, the following is a very effectual method: The cervix is grasped with two pairs of volsellum forceps and drawn well out of the vagina. A pear-shaped incision is made with its apex 1½ inches below the external urinary meatus. It passes down each side of the cystocele and around the cervix. The sides of the incision are grasped and the vaginal wall is separated from the bladder by blunt gauze dissection. The apex of the vaginal flap attached to the anterior lip of the cervix is turned down and the bladder separated by gauze dissection from the front of the uterus. As soon as the peritoneal fold is reached it is incised and divided laterally. The blunt gauze dissection now separates the posterior vaginal wall from the uterus at the side and on the broad ligaments. Sharp fork retractors draw the fundus out of the incision and the cervix is restored within the vagina. Unless the ovaries are diseased they are not removed. A heavy hysterectomy forceps with long blades now grasps each broad ligament. The uterus is divided a half-inch from the forceps and two more pairs are applied, one on each side, with their tips catching the culdesac behind the cervix. The uterus is then cut entirely away. When the tissues are not sufficiently relaxed for easy approximation, a little of the lateral wall of uterine tissue may be left attached to the broad ligament. If there is any tendency of the sigmoid or omentum to prolapse, it is held back by a long pad of gauze inserted into the peritoneal opening. The pairs of forceps, two on each side, are now approximated laterally and a running mattress suture of chromic catgut is applied which passes back and forth behind the forceps completely through both ligaments at such a distance as to tighten the broad ligaments. An approximation of from 1 to 1½ inches of these ligaments is secured. When the suturing reaches the round ligament, it is caught into the angle of dissection where the bladder has been separated from the anterior vaginal wall. This suturing extends backward on each side from this point catching into the broad ligaments and then on each side into the angle of the depth of the dissection, thus compelling the bladder to rest on the broad ligaments. The loose ends of the exposed broad ligament are now approximated by a running buttonhole stitch extending back to the perineal position and the sides of the vaginal mucosal flaps, and closed by a running catgut suture in a submucous manner.

Cancer of the Breast.—W. L. Rodman (*Jour. A. M. A.*, 1915, lxiv, 707) says that early diagnosis and prompt surgical intervention are both necessary. The only rational procedure is to remove all of the tumor with a reasonable amount of surrounding tissues, and submit all to the pathologist, who is present, and who will furnish an immediate diagnosis after making frozen sections. Every one familiar with pathologic conditions in the mammary gland knows that a vast majority of them are either malignant or potentially so. All should therefore be considered malignant until found to be benign. In patients who have reached the age of forty or upward, the immense majority are malignant *ab initio*. Twenty per cent. of carcinomas of the breast occur in women under forty. The lymphatic glands become involved at an earlier stage in the young, and when such is the case, the chances of a radical cure are about one-fourth as great as when they are not involved. Twenty-five per cent. of the patients with axillary involvement are cured by operation; 80 per cent., or more, when there is no such involvement.

Lymphatic Drainage of the Peritoneal Sac.—W. C. Woolsey's (*Annals Surg.*, 1915, lxi, 291) experiments with lamp-black and trypan blue show that absorption of certain solid foreign material injected into the peritoneal sac occurs with marked rapidity, first by a process of translocation through the cells of the diaphragmatic mesothelium and later through the agency of leukocytes. Such solid foreign material having passed the peritoneal mesothelium is conveyed through the endomysial tracts throughout the diaphragmatic musculature to the lymphatic radicles on the pleural surface of the diaphragm, from these through the various diaphragmatic gland groups to the costoxiphoid glands of Sappey, and from thence through the retrosternal chain of lymphoid tissue to the subclavian vein or thoracic duct. Certain fluids injected into the peritoneal sac follow the same lymphatic absorption lines, whether they coincidently enter the blood stream directly or not. The tissues of the diaphragm take a distinctly active part in absorption from the peritoneal sac and that other areas of parietal peritoneum functionate little if any in the lymphatic absorptive process. The postoperative postural treatment of pelvic peritonitis as advocated by Fowler has definite pathological foundation.

Prevention of Postoperative Adhesions in the Peritoneal Cavity.—J. E. Sweet, R. H. Chaney and H. L. Willson (*Annals Surg.*, 1915, lxi, 297) report that in five dogs where no other means than simple careful technic and covering of the operative area with omentum or mesenteric strips were used, adhesions resulted in only one case, this being one where adhesions were found to the uncovered area, the covered areas in the same case being free. In eleven cases where some type of oil was used in the endeavor to limit adhesions, these were formed in nine cases. In one of the cases where adhesions were absent peritonitis caused the death of the animal, only a single case being free from adhesions or peritonitis. In all of the eleven cases more or less extensive exudation was present. In seven out of the eleven cases in which oil was used the phagocytic index was tested, and in all save one experiment with glymol the index was markedly reduced, and even in this case it was not normal. From this work it can be deduced that oil in any form causes an intense exudation of leukocytes into the abdomen and these are inhibited from their normal physiological function by the presence of the oil, as indicated by the low phagocytic index. With the use of citrate solutions involving seven cases there was not a single satisfactory result. Two deaths occurred, one resulting from peritonitis, the other from splitting open of the abdominal wound. In all five other cases, adhesions were noted, while a minor grade of peritonitis was present in one. The process underlying the formation of adhesions is a part of the process of the normal repair of all wounds of serous surfaces consisting in the outpouring of a plastic lymph which seals the lips of the wound. The problem therefore is not the prevention of adhesions, but the limitation of adhesions; if the outpouring of this plastic lymph be entirely prevented, the wound is not sealed and the entrance of bacteria from the intestinal lumen into the peritoneal cavity is unhindered. The most practical method for limiting adhesions consists in the clear understanding of the operator that the peritoneum is not a structure which can be cut and sewn, but a single layer of delicate endothelial cells; that the biologist obtains these cells for study by gently wiping the peritoneal surface with a gauze sponge, then pressing this sponge on a cover-glass; and that every wound of this layer of cells begins to heal by the fundamental process of adhesion formation—the outpouring of a plastic lymph.

Radium Treatment of Fibroid Tumors.—H. A. Kelly (*Surg. Gyn. and Obst.*, 1915, xx, 271) presents a series of thirty-six cases of fibroid tumors of the uterus treated by radium. He has excluded from this plan of treatment only cases which presented some serious complication such as pelvic inflammation, ovarian growths, or obstructive symptoms. The method of treatment employed has been a dilatation of the cervix and the introduction within the uterine cavity of amounts of radium varying from 30 to 724 mg. In some of the larger tumors an additional massive treatment has been given through the abdominal walls. From his results he concludes that massive radium treatment of uncomplicated fibroid tumors is the best plan, as it stops the excessive flow; sometimes in younger women it regulates it without stopping it. Radium reduces the tumors in almost every instance, relieves pressure symptoms, and even causes large tumors to disappear. A fibroid tumor is not a malignant growth; therefore any method of treatment which will give entire relief to the symptoms is the best method, provided it will at the same time avoid the various risks of an operation. If radium is tried and fails, the operation can then be undertaken without any added risk. While a recent radium treatment often makes more difficult the subsequent radical extirpation of a cancer of the cervix, there is no reason to expect this result in fibroid tumors. The writer believes that with increased experience and improved technic, it will be possible to relieve every patient of hemorrhages, and in most instances to do away with the tumor (say in nine cases out of ten), and that without serious discomfort, risk, or confinement to bed for more than one or two days. Patients too anemic and weak even for an intrauterine application of radium can be treated through the abdomen exclusively.

Gall-stones During the Course of Operations for Pelvic Disease.—R. Peterson's (*Surg. Gyn. and Obst.*, 1915, xx, 284) conclusions are based upon 1066 gynecological cases, in 12.66 per cent. of which gall-stones were found. This was in spite of the fact that among the public-ward patients all obvious cases of gall-bladder disease had been assigned to the general surgical service. He says that except when contra-indicated by the condition of the patient or the possibility of contaminating clean peritoneum, the gall-bladder should always be palpated when the abdomen is opened for pelvic disease. Hence, the small abdominal incision should give way to one large enough to permit of thorough exploration of the abdominal cavity. Gall-stones will be found incidental to pelvic disease in 10 to 15 per cent. of the cases. Their frequency will depend upon the ages of the patients more than upon the variety of the pelvic disease. As with gall-stones in general, in women with or without pelvic disease, the older the patient the more liable is she to have gall-stones. Gall-stones are much more common in women who have had children; in the present series of cases, 84.4 per cent. of the 135 women with gall-stones incidental to pelvic disease had borne children. When gall-stones are removed at the time of pelvic operations, from 85 to 90 per cent. of the patients will have no subsequent symptoms referable to the gall-bladder, provided the proper technic be employed. When gall-stones are not removed either because their mere presence is not thought to warrant their removal or because the condition of the patient forbids further operative procedure, 30 per cent. of the patients will suffer subsequently from gall-stone attacks or other symptoms referable to the gall-bladder. Therefore, since gall-stones are always liable to produce symptoms and at times are a distinct menace to the patient, they should be removed when the abdomen is opened for pelvic disease, if this can be done without much additional risk to the patient.

Primary Results of Radium Treatment in Uterine and Rectal Cancer.—H. Schmitz (*Surg., Gyn. and Obst.*, 1915, xx, 363) reports his primary results in twenty-three cases. He finds that in inoperable cases the immediate results of radium treatment are good: hemorrhage, pain, and profuse putrid discharges cease. This improvement is only of short duration and additional applications of radium do not bring about an improvement. The results, however, equal those of any other known treatment. Only one of the twelve cases has shown encouraging results. Recurrent cancers, if far advanced, are very refractory to radium treatment. The result of radiotherapy is practically nil. However, in the beginning and localized recurrences, radium seems to produce pronounced beneficial results and is the most valuable therapeutic agent we possess. The primary results from the prophylactic use of radium after radical operations for cancer are very good. The necrotic tissue is rapidly replaced by healthy granulations and the profuse purulent and putrid discharge changes to serous and odorless secretion.

Uterine Fibroids, Menorrhagia and Radium.—R. Abbe (*Med. Rec.*, 1915, lxxxvii, 379) uses from 50 to 100 mg. (radium element) in concentrated form in tubes placed in thin, smooth applicators without filter for one application of two hours. If, after two months, hemorrhage recurs, that may be repeated. The first concern is to stop bleeding. Incidental benefit comes from slow shrinkage of the tumor. Every six months examination will reveal its diminution. In some cases entire disappearance follows. He regards this as the procedure of choice in all cases except pedunculated fibroids.

Chronic Fixed Retroversion of the Uterus.—B. Solomous (*Dublin Jour. Med. Sci.*, Mar., 1915) says that the only satisfactory treatment of chronic retroversion of the uterus fixed by adhesions, whether the uterus be pregnant or not, is to free the adhesions by the abdominal route and to suspend the uterus. The prognosis, both immediate and remote, is excellent.

DEPARTMENT OF PEDIATRICS.

ORIGINAL COMMUNICATIONS.

PROBLEMS OF THE FOUNDLING HOME.*

BY

JOHN ZAHORSKY, M. D.,

St. Louis, Mo.

I.

THE FOUNDLING HOMES OF THE UNITED STATES.

A TREMENDOUS activity to insure the welfare of the young infant is observed on every hand. Numerous societies have been organized in the last decade for the purpose of studying and preventing the excessive infant mortality. There are movements to improve the hygienic surrounding, the food supply, the maternal care, the comfort and happiness of the young child, but in all these efforts very little, or nothing, can be found directed to the study and prevention of sickness and death in the many infant asylums of the United States.

In studying the literature, only a very few references, incomplete and unsatisfactory, may be found which relate the experience and final result of caring for abandoned infants.

I have taken the trouble to procure the statistical reports of State Boards of Charities, but no figures in regard to the number of inmates and the annual mortality of foundlings are published.

A few months ago I wrote to several members of the Association located in different large cities of the United States, asking them to procure for me information in regard to the number, care, feeding and death rate of infants in asylums. Nearly all of these physicians made an effort, but I received only three reports from more than a dozen inquiries.

Furthermore, inquiries from the Boards of Health in ten (10) States, which are known to have one or more infant asylums, yielded no better results. There are apparently no statistics bearing on this subject, yet from private conversations, the conclusion is inevitable

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* Eighth Annual Meeting of the Association of American Teachers of the Diseases of Children, Philadelphia, June, 1914.

that the death rate of infants in many asylums is still very high, a death rate of 40 to 50 per cent. not being uncommon. As a matter of fact, most institutions have great reluctance in giving out the actual figures because these do not make a very good showing.

No rules and regulations, so far as I am aware, are prescribed by law separate and distinct from those applying to children. The rules adopted by the Michigan State Board of Corrections and Charities provide that "the feeding of infants shall be subject to the direction of the local board of health."

In St. Louis the foundling homes are required to have a resident physician and obtain an annual permit from the Board of Health. No report, however, is made to the authorities. While a complete report of one institution is herewith given, the report from the other is fragmentary. It is a curious fact that bad results are hidden.

It is high time that boards of charities, health officers and statisticians pay more attention to the infant asylum. It is a disgrace to the United States that there are still numerous institutions ashamed to publish their mortality. The ridiculous excuse that these babies are better dead than alive needs no comment. Even foundlings may make useful citizens and the state should give them an equal chance with at least the poorest of its citizens. Every such institution should show what it is doing, and if its mortality is too high, should cry for help instead of hiding its shame. This rich country will take care of its dependent babies, of this we can be sure, but we must know they are in need.

This association should take vigorous steps in this matter. We must know what is going on and then the remedy may be applied. Let physicians all over the United States, who have charge of infant asylums, begin to think, compare and analyze. It is only in this way that any progress can be made. I cannot but hope that the study herewith presented may stimulate other physicians to make reports, even though they may be unfavorable.

A few weeks ago a request was sent to fifteen physicians located in large cities asking them to obtain statistical data concerning foundling homes. I enclosed a list of questons to be answered. Nearly all replied that they would make an effort to obtain the information, but in the end only three of the blanks were filled out. For the first I am indebted to Dr. E. W. Mitchell of Cincinnati.

Name.—Home for the Friendless and Foundlings.

Location.—Court St., near John, Cincinnati.

Average number of babies admitted annually.—150.

Number admitted in 1912.—162.

Number died in 1912.—8.

Number admitted in 1913.—137.

Number died in 1913.—5.

How many infants receive breast milk?—Very few are breast fed longer than two months. The majority have breast milk for only one or two weeks.

What are the usual milk mixtures given to the healthy infants?—Cows' milk diluted with oatmeal or barley-water, according to the condition of the bowels.

What foods are used for sick infants?—

What precautions are taken to prevent infections?—All contagious diseases are cared for by the hospital. All infectious diseases are cared for by one nurse and isolated.

Do separate nurses feed and change the babies?—No. Have a head nurse and three pupil nurses, who care for the babies entirely.

This report does not give the length of time the infants remain in the home, but the results are certainly gratifying.

I am especially glad to be able to give a statistical report on the largest institution of its kind in the country, the New York Foundling Hospital. For this I am indebted to Dr. Wm. L. Stowell and Dr. N. R. Norton.

Name.—The New York Foundling Hospital.

Location.—New York City. 68th St. and Lexington Ave.

Average number of babies admitted annually.—2500.

How many infants receive breast milk?—Fifty per cent.

What are the usual milk mixtures given to the healthy infants?—Mostly whole-milk dilutions.

What foods are used for sick infants?—Some form of milk.

What precautions are taken to prevent infections?—Quarantine twenty-one days on admission. Immunize measles and other quarantined cases.

Do separate nurses feed and change the babies?—Yes.

MORTALITY REPORT OF THE NEW YORK FOUNDLING HOSPITAL

1912			1913
2279	No. of children on hand		2269
2190	No. of children received		2326
581	No. of children returned to parents		675
56	No. of children transferred		45
468	No. of children adopted		428
1095	No. of children died		1114
4469	Entire number treated		4595
2269	Remaining Jan. 1, 1913	Remaining Jan. 1, 1914	2333
24	Percentage of mortality	Percentage of mortality	24

Of the 2190 received, 1915 were under one year.

Of these 1494 were below normal.

Of the 2326 received, 1950 were under one year.

Of these 1759 were below normal

This institution, as is well known, is conducted in a manner that is above criticism and has had connected with its development some of the most prominent pediatrists of the country.

In this connection, it may be interesting to compare the death rate of an infant asylum given in recent literature.

MORTALITY IN THE INFANT ASYLUM OF DÜSSELDORF
(Schlossmann).

	Admitted	Died	Per cent.
1903	45	33	73
1904	31	20	64
1905	36	25	69
1906	53	40	75

Schlossmann(1), than whom there is no greater authority on this subject, succeeded after six years of hard work in reducing this high mortality to less than 20 per cent., and what effort it took may be judged from his recent article.

Schelbe(2) reports still worse results. Fully 80 per cent. of the infants in the asylum at Breslau died. This sounds very much like the reports occasionally found in the literature twenty-five years ago, and demonstrates that "hospitalism" in its old meaning has more than an historical interest.

To return to my search for information, it should be stated that I wrote to the boards of health in many States. Only short excerpts will be given from the answers obtained.

Iowa.—"Such institutions do not report to the State Board of Health."

Michigan.—"The Legislature of 1913 placed the licensing of these institutions in the hands of this board. Since that time we have not compiled statistics relating to these institutions, but will have the data in shape for the next biennial report."

Minnesota.—"I am not aware of a single home that can be called a strictly foundling home in this state. There are a number of homes where dependent children are cared for, but it would be impossible to get the information you request even concerning these."

Wisconsin.—"When an institution of this kind is organized, the law provides for the registration with the local officials and no provision is made in the law for making a report for any state department."

New York.—Among the voluminous statistical material published by the State Board of Charities, nothing is found which tells what the infant asylums do with their babies.

Indiana.—"There are no institutions in this state especially for foundlings. As a rule, they are cared for in the local orphans' homes. We have no statistics concerning them."

Illinois.—"Statistics of the Chicago Foundling Home given in the sixth annual report:

December 31, 1911.	
Present at beginning of year	55
Received	243
Total	298
Placed in homes, etc	62
Died	7
Present at end of year	47

I know nothing else concerning this institution."

At the last moment a report from Philadelphia was received, for which I am indebted to Dr. H. Booker Mills. The information was obtained by Miss Gertrude Rhoads. One answer is from the Philadelphia General Hospital and has hardly a place here. The other is the report from St. Vincent's Home. It is incomplete and unsatisfactory in that it does not give the actual number of deaths. The mortality (10 per cent.) is evidently a mere guess.

REPORT OF ST. VINCENT'S HOME, PHILADELPHIA.

Number admitted in 1912	560
Number admitted in 1913	620
Number died in 1912	10 per cent.
Number died in 1913	10 per cent.

150 a year receive breast milk.

To prevent infections, hands are scrubbed with bichloride solution. There is an isolation building.

Separate nurses feed and change the babies.

No answer was received in regard to kind of food used.

II.

THE BETHESDA FOUNDLING HOME.

Bethesda, an organization for the purpose of distributing Christian Charity, was founded in St. Louis by Dr. E. W. Saunders and Mrs. Roger Hayne in 1889. We are here interested only in that department known as the Bethesda Foundling Home, which cares for and obtains homes for dependent infants. This institution is supported almost entirely by voluntary contributions, a small amount being obtained from the City of St. Louis. The expenditures are ridiculously low, forced to be such by an insufficient income.

We have calculated that each infant costs the institution about $17 a month.

The nurses and attendants receive little wages, as the Foundling Home is a part of a training school for nurses. The Asylum is owned by the organization.

The few funds that are available necessitate the utmost economy in expenditures. The help is always insufficient, and many faithful nurses are often compelled to work ten to twelve hours daily with no intermission.

The milk supplied during the last six years is a commercial pasteurized milk of good quality. This milk has really given most excellent results, and our intestinal infections (ileocolitis) have become much less under its use. Certainly the results are superior to those obtained from a raw Walker-Gordon milk (high priced) which was tried two years.

The utmost restriction of expenditures for labor frequently forces on the institution incompetent and transient help.

In spite of the financial handicap, the success of the Bethesda Foundling Home is one of the wonders of St. Louis. While I have been connected with this institution for the last seventeen years and went through the vicissitudes of the early period, I desire here to disclaim any special credit in the evolution of the present successful working system. The credit belongs entirely to the Superintendent, Dr. E. W. Saunders.

The Home has two floors for the care of infants. Each floor has forty to sixty inmates. The floor is divided into two large rooms, separated by two smaller rooms. The southern room is occupied by the babies in the daytime, where they receive plenty of air and light. The sun is permitted to shine in this room all day, except on very hot days in the summer. The northern room is the dormitory, where the babies are removed for the night. These are called the day nursery and night nursery respectively. The day nursery has all its windows open all night, while the night nursery is aired through the day. This gives the baby a change of air and odors twice a day. This is especially important in the early morning when the babies receive their bath and are removed from the bad atmosphere of the night nursery, which is always putrid in the morning in spite of good ventilation. The removal to a fresh room is a powerful stimulant to the appetite and nutrition. We regard this change of rooms every twelve hours as one of the most important parts in the system.

The small rooms between the nursery rooms are separate; one is the diet kitchen, the other the bathroom. The diet kitchen has a large refrigerator in which the milk is kept in cans, which stand constantly in ice water. This is a most efficient refrigerator. The food is prepared every three hours from this ice-cold milk and at once fed to the babies. We regard this way as much superior to the common method of preparing all the bottles in the morning and allowing the milk to stand in separate bottles. The refrigeration of several hundred bottles properly is very difficult. Keeping several gallons of milk cold in a can is much simpler. The milk comes to us pasteurized and cold. It is kept cold until given to the baby. Each three hours the nurse prepares enough food for all the babies. This method seems to necessitate much work, but in reality is simple. One nurse prepares the food and feeds about fifty babies, with one assistant. The assistant walks up and down between the beds and watches that all the babies get their food. Young babies are given particular attention. As soon as the bottle is empty, it is taken to the diet kitchen and rinsed with cold water. When all the bottles are collected, they are scrubbed with a brush by hand in a warm soda solution, again rinsed and all the bottles put in a large dish-pan, covered with water and boiled for a few minutes. With the bottles are boiled other utensils necessary for the modification of the milk. The nipples are washed the same way and boiled between each feeding.

Several routine formulas are used for the healthy infants. Those taking the same mixture and the same amount are grouped together and their food is mixed at one time. Thus: if fifteen babies are taking 6 ounces of a formula No. 2, about 100 ounces are prepared and 6 ounces put in each bottle. These are warmed at once and given to the babies. The nurse then makes up another quantity for another group. Special formula, of course, are also prepared. The system has been so well worked out that one nurse can feed fifty infants even without an assistant when necessary.

A very important rule, which is strictly carried out, is that the feeding nurse is not permitted to change the babies napkins, or touch the babies in any way. This prevents the transference of intestinal and other bacteria from one infant to the other.

The infants are bathed and cleaned in the bath room by separate nurses. During the bathing period three to five nurses are at work on each floor. During the day one nurse is constantly employed changing the babies napkins and keeping them comfortable.

It is scarcely necessary to mention the care in keeping the baby dry, in treating excoriated buttocks, intertrigo, eczema and furunculosis. Special pains are taken not to carry infections from one infant to the other.

The clothing is the simplest. Flannel bands are not used, except for very young babies. In the summer no effort is made to protect the abdomen by a flannel band. It is more important to keep them cool. Even fans are installed when the temperature gets to 90 degrees or more. No attention is paid to draughts in the summer. The wind is allowed to sweep through the nursery. The babies are dressed according to the temperature.

The Food.—Various foods were tried in the early period. Condensed milk was used for many years. Then Walker-Gordon 8 per cent. milk was used. We have gotten the best results from a pasteurized commercial milk, which has been the principal food for several years. We are not afraid of a little extra fat, and find it necessary for most young infants. The milk stands for three hours in a large can, then the lower half is siphoned off. Top milk is used in our standard formulas. This top milk contains about 6.5 per cent. of butter fat. We have had it analyzed several times.

Our standard formulas are as follows:

No. 1.—Called Weak Modified Milk.

	Ounces
Top milk	25.0
Lime water	5.0
Water	70.0
Cane sugar	4.5

This has approximately the following composition:

	Per cent.
Protein	0.9
Fat	1.6
Sugar	6.1
Caloric value of each ounce	13.7

This formula is used for a few days only in young infants. They are soon placed on formula No. 2.

No. 2.—Called Strong Modified

	Ounces
Top milk	40.0
Lime water	7.0
Water	53.0
Cane sugar	4.5

Approximate composition:

	Per cent.
Protein	1.4
Fat	2.6
Sugar	6.5
Caloric value in each ounce	16.0

This is our standard formula for all young babies, and is used until they are six to eight months of age. Babies who seem hungry on this mixture are often placed on formula No. 3.

No. 3.—Called Strong X Modified.

Top milk	50.0 ounces.
Lime water	8.0 ounces.
Water	42.0 ounces.
Sugar	4.5 per cent.

Caloric value, 18 to each ounce.

Older infants are fed on plain cows' milk, to which gruels, soup and bread are added.

It has become a rule of the institution to feed the babies liberally, in fact, Dr. White several years ago improved conditions very much by disregarding the danger of overfeeding to a great extent. The food of the young infant is rapidly increased until it gets all it wants. If dyspeptic symptoms arise, the food is reduced for a few feedings only, then again increased. Tolerance is not increased by starvation; slow starvation favors the appearance of intoxication and atrophy. If the young baby learns to digest plenty of food, the subsequent dangers are diminished. Our results have apparently proven the advisability of insisting on a full diet. The energy quotient of the daily ration is rarely below 120, often 150, or even more.

Our sick foods are rice water, buttermilk, flour gruels, sometimes casein buttermilk (eiweissmilch), malt sugar (Mellins' food, dextrimaltose) are only occasionally prescribed. Human milk, very desirable at times, is only rarely obtainable and then in small quantities.

Mortality.—In the following table the annual admissions and deaths are recorded. Emphasis must be placed on the fact that these mortality figures are based on the number of admissions. This tells the number of babies who die before they leave the institution. Some of the deaths, therefore, do not belong to the year as recorded in this table, but belong to the following year.

MORTALITY AT BETHESDA.

Year	Admitted	Died	Per cent.
1893	82	37	45
1894	138	78	56
1895	142	76	52
1896	160	86	53
1897	204	120	58
1898	94	41	43
1899	185	78	42
1900	148	83	55
1901	92	35	38
1902	130	42	35
1903	122	26	21
1904	160	29	18
1905	134	46	34
1906	124	46	37
1907	131	28	21
1908	91	11	12
1909	100	17	17
1910	120	11	9
1911	159	27	17
1912	120	25	20
1913	177	20	11

If we figure the annual mortality, as is usually done, by adding at the beginning of the year all the infants carried over from the preceding year, the figures are quite different. The following table shows the mortality on this basis for ten years.

MORTALITY AT BETHESDA.

Calculated on the basis of the number of infants on hand plus those admitted.

Year	Admitted and on hand	Deaths	Mortality, per cent.
1901	252	70	27
1902	197	57	29
1903	203	49	24
1904	212	34	16
1905	241	47	19
1906	224	49	22
1907	224	49	22
1908	222	34	15
1909	175	18	10
1910	178	15	8

These figures also include some hospital cases not included in the first figures; also some infants above two years of age.

III.

ST. ANN'S ASYLUM.

This institution is conducted by the Sisters of Charity. Several hundred infants are cared for annually. The building and equipment are excellent. Everything is kept clean and sanitary. The diet kitchen contains a large refrigerator. A steam sterilizer to sterilize the bottles stands in an adjoining room. The milk is obtained from their own farm.

About two years ago I was asked to take charge of this institution. The mortality for years, according to common report, had been very high. Dr. J. R. Clemens, who had charge of St. Ann's for a few years, in 1911 made the following report to the St. Louis Medical Society:

Infants under 18 months present in St. Ann's Jan. 1, 1909	91
Admissions	251
Total	342
Deaths	165
Mortality	48 per cent.

Infants present Jan. 1, 1910	70
Admissions	280
Total	350
Deaths	155
Mortality	44 per cent.

These mortality figures are based on the number admitted plus those on hand.

In October, 1912, the first floor of St. Ann's was placed under my charge. In this I was ably assisted by Dr. T. W. White, who had several years experience at the Bethesda Foundling Home. Later, Dr. W. A. Smith visited the babies daily. In spite of our efforts, the mortality did not diminish the first year. The ravages of hospitalism remained unchanged. Our mortality was fully 40 per cent. At the one home intoxication and marasmus (decomposition) had been eradicated for several years. In this institution it was still present in its virulent form. The substitution of the milk formula used at Bethesda made no impression on the mortality. The young babies did not thrive. Changes to whole milk mixtures, buttermilk mixtures, casein buttermilk (eiweissmilch) did not change the result. We fed raw milk, and boiled milk, milk with much sugar or little sugar, it was all the same. The infants died of acute infections and nutritional disturbances. Even those who survived did not look well. Here, then, was an opportunity to study hospitalism in a bad form.

The second floor was in charge of Dr. Jules Brady, who had worked here for some years. The Sister in charge had been slowly trained, until she was very efficient. Dr. Brady fed buttermilk and skim-milk mixtures from the beginning. He attributed his better results to the use of buttermilk, cereals and maltrose (Mellin's food). His conclusions were erroneous in my judgment. For I agree with Schlossman that the food has nothing to do with hospitalism, provided it is pure and sufficient in quantity. The better results upstairs were simply due to different environment (hospital milieu). We tried Dr. Brady's mixtures faithfully on the first floor and had no better results than with sweet-milk mixtures. In fact buttermilk mixtures are good foods for temporary use for the sick, but a young baby should be trained, and can be trained, to a more rational food, as our experience at Bethesda has abundantly shown. It is only necessary to refer to the results of Schloss, in infant asylums, who feeds high cream mixtures to give additional evidence that butter fat has not the dangerous qualities which are ascribed to it in certain quarters.

After nearly two years of training and watching, we were gratified to see a great improvement in the morbidity and mortality at St. Ann's Asylum. While diphtheria, staphylococcus, streptococcus, pneumococcus and other infections were widespread when we began our work, the prevalence of these diseases had very much diminished. But gastroenteric intoxications and marasmus had still not been entirely eradicated. Unfortunately no statistics can be given.

IV.

HOSPITALISM.

Hospitalism is a general term used to designate the aggregate detrimental influences, which affect the infants kept in hospitals and asylums. Some recent authorities reject the word as meaningless and inapplicable to the modern hospital. Even Freund,[3] in his recent monograph, tries to get rid of this word, but in the end has to admit that we cannot as yet resolve these influences into all their various components. It is a convenient, although temporary name. and still has some factors in it that are not understood.

THE PHENOMENA OF HOSPITALISM.

(1) *The infants in an asylum do not gain in weight as rapidly as those in the home.*

This truth may be shown by taking the average weight at different ages. In the following table, the average weight of infants in the home is taken from an analysis of over 100 cases seen in private practice, the majority of whom had some form of nutritional disturbance. It will be seen that the average is less than what is usually assigned as the standard for the normal baby. The second column gives the average weight of the babies at the Bethesda Foundling Home, for which I am indebted to Dr. Ritchie. The third column is taken from the weights (both floors) of St. Ann's Asylum.

AVERAGE WEIGHT OF INFANTS.

Months	Private practice, pounds	Bethesda, pounds	St. Ann's, pounds
2	9.5	8.0	7.75
3	10.5	9.5	8.5
6	14.0	11.5	11.0
8	16.0	13.0	12.5
12	19.5	14.5	14.0
15	21.0	16.0	17.0

The deficiency in growth is also shown by taking a large number of babies and computing the average weekly gain. In an analysis of seventy-three babies (1913) remaining in the Bethesda Foundling Home from two weeks to nine months, the average weekly gain was 2.75 avoirdupois ounces or 76 grams. This certainly is low and yet it compares favorably with the results of Schloss, whose average was less than 12 grams daily, about 80 weekly.

WEEKLY GAIN OF INFANTS—FIRST YEAR.

Private practice	100 gm.
Bethesda Home	76 gm.
Schloss	80 gm.
Normal infant	115 gm.

Our babies always look well and only the experienced would detect that they are under the average in weight.

Several years ago I made some measurements in length. These, too, are under the average. Backwardness in teething and closure of the fontanelle is generally observed. Finally, the slow development of sitting, standing, walking and talking is so obvious that definite figures are unnecessary.

(2) *The infant in the asylum requires more food to obtain the same amount of growth than the infant in the home.*

This law is placed here only tentatively. No doubt, it will be contradicted. Nevertheless, it is a plain deduction from plain numbers.

Energy quotient of food for babies.
(Private Practice).

80, 90, 95, 100, 90, 110, 95, 85, 95, 90, 80, 85, 80, 100, 95.

Energy quotient of food for babies.
(Bethesda Home).

130, 170, 110, 145, 140, 95, 110, 120, 110, 120, 160, 170, 165, 180, 105.

Proportionate to its weight, the hospital baby needs more food. This may partially, but not entirely, be explained by the fact that they take the quantity of food according to age and they are smaller than normally, yet this does not explain the difference entirely. Why should the infant lying quietly in a room, nearly always the same temperature, require more food than the infant who exercises, and is carried from one room to the other, and then show smaller increment of weight?

Our rule at Bethesda is that the nurse should watch for signs of hunger—if the baby is not satisfied when the bottle is empty, she records this. It is our custom to satisfy the baby's hunger. It was by paying particular attention to this that Dr. T. W. White succeeded in lowering the mortality from 20 to less than 10 per cent.

(3) *The infants in an asylum show subnormal resistance to infections.*

This is proven not only by the high mortality, but also by the phenomena of disease. In the skin infections the swelling, redness and pain—the local reaction—is much less than in the normal infant. In nasal infections the discharge is less and more persistent. Pseudomembranous patches in the throat are less exuberant and accompanied by less swelling. Adenopathy from local infections is not marked. On the other hand, the final stage of bacterial resistance—suppuration, is more pronounced, and indicates that at least one line of defense to infections is hard to break down. The general reaction—elevation of temperature, thirst, nervous excitability, convulsions, is also much less. On the contrary, low temperatures, feeble circulation, apathy, stupor and profound prostration are the cardinal symptoms.

(4) *These infants are more susceptible to infectious diseases.*

In the homes so many young infants show a comparative immunity to certain infectious and contagious diseases, such as measles, whooping-cough, etc. In the asylum the babies "catch" everything to which they are exposed.

(5) *The infants die from trivial causes.*

In an asylum a coryza, a furunculosis, cystitis, bronchitis, otitis media, or simple stomatitis are often fatal diseases. Diphtheria is usually fatal before the exudate is large. Pneumonia kills with only a part of a lung consolidated.

(6) *The temporary immunity to disease is not lasting.*

Thus it is not uncommon in an asylum to have repeated attacks of pneumonia, furunculosis or bronchitis during the same season. Tonsillitis is comparatively uncommon, showing that the lymphoid structures are less active. I have seen even a second case of measles in a short time in an asylum infant.

(7) *The mortality is very high.*

We do not now hear of a death rate of 80 to 90 per cent., but it is still 40 to 50 per cent. in many institutions. The mortality of individual diseases is much higher in an asylum than in the home. Judging from my past experience, I would place the mortality of pneumonia at 40 per cent., dysentery at 70 per cent., diphtheria at 40 to 70 per cent.; erysipelas at 80 per cent. Whooping-cough is fairly well tolerated and measles may be comparatively mild. The nutritional disorders in private practice have a low mortality, not more than 2 per cent. from my records. In institutions they may go up to 50 per cent. in young babies.

THE CAUSE OF HOSPITALISM.

It is unnecessary to speak of the direct cause of death. In the Bethesda Foundling Home we have, for several years, had very few deaths from marasmus or gastroenteric intoxication. (I still prefer these terms to decomposition and alimentary intoxication.) These were in premature infants or infants admitted in a moribund condition. Our deaths are clearly due to infections. In fact this is the final cause in nearly all cases. Asepsis is the first essential in all infant asylums. In regard to the epidemic appearance of intoxication and marasmus, which still occurred at St. Ann's Asylum two years ago, my own observation tends to confirm the old theory of Hutinel, that some virulent intestinal bacteria are at the root of the disease. Probably the word virulent is not quite correct, the word morbific would be better. They may be only especially active in feeding and proliferation producing putrefactive products normally found in all infants artificially fed, but in very large quantities. Again and again in former years in Bethesda epidemics of this appeared. The infants do not thrive, refuse food and their skin becomes sallow, even gray. The stools become offensive, somewhat thinner, faintly acid or alkaline and symptoms of intoxication appear. Diarrhea is not a marked symptom, although the stools are watery. The intoxication becomes less under starvation, but the tolerance to food is not restored except after a prolonged period. Usually they die of fatal atrophy (marasmus). The introduction of one such case into the nursery causes the appearance of others. Of this I have become convinced and have recorded one interesting circumstance in the *St. Louis Courier of Medicine.*

But we will leave the etiology of marasmus and discuss the other fundamental phenomena. Why do babies in asylums develop so slowly and imperfectly, in spite of a very plentiful supply of food?

Finkelstein lays most stress on repeated infections. Yet to those of us who watch the artificially fed babies in their homes, this explanation is not satisfactory. All babies are more or less subject to repeated infections. Again and again infants receive grippal, pneumococcic and other infections through the winter months. How many infants go through the winter without an acute coryza, a tonsillitis, a bronchitis or pneumonia. Then there is whooping-cough, measles, etc. The environment in the average home, with the children of the family going to school, with its daily visitors favors repeated infections. And yet these babies grow, averaging according to my own cases in practice, 15 to 18 grams as a daily increment in weight. They throw off infections and the loss during the acute illness is compensated by a more rapid gain during convalescence. Even Freund has to admit that the home environment stimulates nutrition and growth in some way, after his careful experiments, and he can only indicate in a general way what researches are necessary to elucidate the problem; namely, it is necessary to study the psychic and nervous influence on metabolism in general and on the course of nutritional disturbances in particular.

In the Bethesda Foundling Home infants get a superabundance of food. There has been a marked fall in mortality since Dr. White instituted the rule that a baby should be fed all it wanted. They get plenty of light and air, except for a short season in the winter. Infections are not more common than in the home. The only marked difference between this institution and the home is, the babies are not taken out of doors. We tried this several times and it usually does harm. In two instances flies covered the babies and resulted in serious digestive disorders. Nothing offers itself, except the psychic theory, which Parrot first formulated and which has been changed somewhat by other writers. The baby in the home, when uncomfortable, cries and the response to this cry, whether caused by hunger, thirst or discomfort, is the first psychic influence unappreciated in the asylum. The baby in the home soon becomes interested in the surroundings, it is stimulated to exercise, it is made to laugh. The babies in the asylum never laugh, or even cry except in severe pain.

Then there are the many little neglected details of good nursing, almost imponderable, as Baginsky has used the word. We find this in the homes as well. There are some mothers or nurses who have a wonderful influence on the growth of their baby. There are others who lack this innate faculty and their babies never do well.

We have made great progress in caring for infants in asylums, but to quote Schlossman: "This is the astonishing and obscure thing, why in the hospital we cannot succeed with such a minimum of care" as in the private homes.

The psychic theory is very much favored by Birk in a recent article: "It is not a question only of individual care and of some one paying especial attention to the infant, but the nursing must be of such character, as to produce an inner satisfaction." He emphasizes the spiritual contact between child and nurse.

The physician is very apt to make light of that mental anguish, which a mother gets when separated from her baby, or when her baby, itself, is suffering, but it lies at the root of our early life.

PROPHYLAXIS.

Very briefly the following rules are added to assist those who may be still struggling with difficulties in the asylum.

1. Greater efforts should be made to have newly born healthy infants quickly adopted. This is generally neglected. By a careful examination and blood examination (Wassermann test), even an infant a few days old may be pronounced healthy. The custom of keeping babies until they are several months old before an effort is made to place them in a home is wrong. Several institutions in this country are doing good work in trying to keep the infant for a very short time only.

2. Provide a suitable building and get enough money to take care of the infants properly. This can be done if it is only done in the right way. Never should an infant asylum be made a place for making money.

3. A resident physician or interne must be present, who is inter-

ested in and understands infants, who lives with the babies, knows them all and is promptly accessible at all times.

4. The nurse in charge of the infants should be well trained. She must be a mother who knows her babies, who can promptly detect their wants and who investigates every cry. She must know that this baby is hungry, this baby is in pain, this baby is in discomfort. As a mother, she must know at once that something is wrong with the baby. She must live with her babies and her work. She must have sufficient intelligent help. (The common idea that a woman who has reared one or more infants at home can properly care for an asylum is preposterous.)

5. The nurse in charge must be trained in asepsis—instinctively she should shrink from infectious material, be it pus, blood, mucus or fecal matter. The nurse who feeds the babies must not handle anything but the bottles. The cleaning of the babies must be done by some one else. Frequent disinfections of the hands is necessary.

6. *A hospital department should be provided, in which all sick babies are placed, which should be entirely separate from the nurseries and should be under the care of skilled nurses.*

The commingling of the sick and healthy, all attended by the same person, is extremely dangerous practice.

7. *Two nurseries should be provided, one for the daytime and another for the night.*

It is only in this way that proper cleaning and airing of the rooms can be done.

8. *The babies' milk should be clean, pasteurized at the lowest effective temperature and kept ice cold.*

It is a mistake to boil the milk, many authorities to the contrary. Boiled milk lowers the resistance of the infant to pathogenic influences. Pasteurization at 145 to 150 degrees for twenty or thirty minutes is a much better practice.

The practice of preparing all the bottles in the morning and allowing each feeding to stand in the bottle, has not proven so successful in my observation, as the practice of preparing food from cold milk and feeding it at once. The only really effective method of keeping milk cold is to have it stand in ice water. This is best done in large cans and not in bottles.

9. *The actual formula of milk modification is of secondary importance, but the infant must get enough food.*

If the fat is kept low it necessitates more protein and more carbohydrates. It should be remembered that one part of fat is equal to two and one-fourth parts of carbohydrates. Giving too much carbohydrates favors fermental diarrhea. This is especially true of some of the malt preparations. Most malt preparations are very easily fermentable. Their use is sometimes necessary to diminish a tendency to intestinal putrefaction, as shown by foul, alkaline, light-colored stools. Here some malt added to the milk mixtures often acts favorably. Wheat flour dextrinized by heat can be used for the same purpose, and it is safer since its fermentive quality is not great. As a rule, it pays to give a good percentage of cream. A preparation with a very high content of sugar (as condensed milk) is not suitable for use as a general food in an infant asylum.

Starvation, especially of the young infant, must be carefully avoided. The nurse must take great care to see that the young baby takes all the food prescribed. Tolerance is diminished by starvation.

10. *The first symptoms of illness must be recognized at once.*

This is where more blunders are made than in anything else. These babies do not react to morbific influences as promptly as the baby in the home, and then the symptoms at first are very mild. Often two or three days passes before it is recognized that the baby is sick. Then it is too late to do anything.

It takes more money, work and skill to care properly for an infant in an asylum, than in the home. The asylum is an expensive, wasteful method of rearing young infants.

1460 South Grand Avenue.

BEST ARTIFICIAL FOOD MIXTURES FOR HOSPITAL BABIES.[1]

BY

HARRY LOWENBURG, M. D.,
Philadelphia, Pa.

Difficult as the feeding of infants may at times become, there is no problem in the whole realm of infant dietetics which presents as many uncertainties and difficulties as the feeding of the hospital baby, one year old or younger. My experience is that nearly all, if not all, asylum feeding cases do badly. The well get sick and the sick get sicker. I do not mean that one never meets a case that is thriving or that all these babies succumb. The exception is, how-

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[1] Read at the Eighth Annual Meeting of the Association of American Teachers of the Diseases of Children, Philadelphia, June, 1914.

ever, to see a fat, robust, red-cheeked, artificially fed infant in a babies' ward. Most of them get along indifferently well. The best that can be expected is that they shall gain a few ounces now and again or else remain stationary. Those who have had an extended clinical experience will be able I am sure to subscribe to this view. It may be interesting for a moment, before discussing what feeding methods or foods are best for these babies, to wander afield sufficiently to contemplate the cause or causes for the great amount of morbidity among this class of patients.

The term "institutionalism" or "hospitalism," if properly understood, signifies perhaps best that from which these babies suffer. They lack mothering. They cannot receive prompt detailed attention with reference to their major and minor physical needs. Their diapers are not promptly changed. By the time the last baby is cleansed the first one is soiled again. An infant is permitted to soak his buttocks in a bowel movement too long. This makes him uncomfortable and irritable and this reacts upon his digestion and his nutrition consequently suffers. His bottle is not held for him. His food gets cold. He may fall asleep with the nourishment untouched or half finished. His mouth is not always thoroughly cleansed. Briefly it may be stated that in most hospitals, in both general and in those devoted especially to infants, unless under exceptional financial and other conditions, there are too many infants assigned to one nurse. Much morbidity is also caused by overcrowding. This results in infections and in cross-infections. The deficiency in air space is also responsible for much sickness.

Finally one of the most potent baneful causes, the result of hospitalism, is that these cannot or are not studied sufficiently from the individual standpoint. Stock mixtures are provided. Routine methods are practised. New schemes and fancies are tried out upon a batch of infants. The individual digestive and caloric requirements are not sufficiently catered to. These babies remind one of many furnace fires in so many homes which during the winter are banked for the night. Coal has been supplied but the draught has been shut off. Combustion does not occur nor does the fire go out. When the draught is supplied in the morning, combustion is normally resumed. So, too, these babies require something which they cannot receive in hospitals which will cause their digestive and heat-transmitting apparatuses to properly functionate. This something is commonly supplied as soon as they are removed from the institution.

Now as to the actual feeding of these babies two things must be considered—the baby and economy. I will consider the latter first. The strictest economy is practised by employing the best and most expensive milk wisely used. By this I mean that the formula must be made up in such a manner that the least waste will ensue. For this reason I believe that top-milk mixtures are too expensive and that whole or skim-milk dilutions or mixtures of milk or skim-milk and cream are the most available and economical. For many years at the Philadelphia General Hospital the Baner method has been followed to secure percentage mixtures and is probably as good as any. In hospitals I have observed excellent results from the use of pulverized flour ball with and without the addition of the extract of pancreatin and with and without bringing the mixture to the boiling-point. I am still a believer in the disturbing influence of unchanged cow protein. I still believe that most of the curds found in stools are protein and not fat. I do not believe that fat and sugar are the sole disturbers of digestion and the causes of all our woe. I believe on the other hand that sugar, provided that it is cane-sugar or one of the maltose preparations, is rarely a source of trouble.

The baby must be studied from two standpoints: His weight and his digestion. If these are correct and indicate that the nutrition of his organism is progressing satisfactorily, the food which he is receiving is of secondary importance. The best analyst of any formula is the infant himself, and no minute formula manipulating will make him gain if he will not, nor will he cease gaining because theoretically his proportions of protein, fat, sugar, are wrong. I do not want, by this, to be understood as an advocate of slip-shod methods, I simply mean to indicate that we cannot be too hidebound in our opinions as to what is best.

I believe that each case should be individualized and carefully studied, and this is often impossible in hospitals. The teaching and practice of percentage methods has done much to advance the idea of individualization. When applied to a correct reading of the stools the best results are obtained. Do these indicate fat intolerance? Correct it. Do they indicate protein or sugar intolerance? Adjust them according to the percentage idea. This is the sap of infant feeding. Inside or outside the hospital, he will be the most successful feeder who can most intelligently read the stools, correct symptoms indicating some special intolerance for this or that or more elements and then applying his remedy by manipulating his formula by any method he chooses, the simpler the better. I have no quarrel with top-milk methods any more than I have with whole-milk dilutions or caloric estimations. Each has its good features. For years I knew no method of feeding other than top-milk mixtures, and my results were excellent. And I with others owe a debt of gratitude to these mixtures and to the distinguished gentleman who expounded them. I still employ them, but not exclusively. I get as good results with whole-milk dilutions when these are applied to the individual requirements.

I have also seen some excellent results from the use of buttermilk, flour and sugar mixtures in cases of fat and in protein intolerance where each condition occurred independently or where they coexisted. This method of feeding must not be continued too long without the addition of gradually increasing amounts of cream and the simultaneous exhibition of fruit or vegetable and of animal juices, and the inunction of cod-liver oil.

Before closing I wish to urge upon this association the necessity of adopting some uniform method of teaching milk adaptation or milk modification. This work rightly falls within the province of an American Association of Teachers of Diseases of Children. The utmost confusion still exists. The influence of the German school of calory feeders has been strongly felt in America. And yet this method is by no means a *conditio sine qua non*, as some would have us believe. Shall we teach this or the percentage method? Shall we teach both or neither? A conscientious instructor finds himself in a quandary. The answer is not easily found—How best to present the topic to the junior or the senior medical student? If we teach percentage feeding, shall we teach Holt's, Chapin's, Roch's, or Baner's method? If we teach all, we will surely confound the student and will cause him as of yore to shun the topic. The laboratory prescription writing is impracticable, unsatisfactory and leads to professional stagnation and ignorance. The best rule is to present no particular method to the student, especially none which entails a knowledge of many figures. It is best to instruct him diligently how to read the stools and to estimate the caloric requirements and then endeavor to adjust his food by simple dilutions of whole milk or by other physical or chemical methods. I believe the subject to be of sufficient importance to move that a committee be appointed to study the subject and to report at the next annual meeting as to the best method or methods of teaching milk feeding. If a sane, clear conclusion is possible, this association will not only render a great service to the profession but will earn the gratitude of the lay public as well. Much will be accomplished toward lessening infant morbidity and infant mortality.

1927 NORTH BROAD STREET.

THE PREVENTION OF INFANTILE ATROPHY IN HOSPITALS.*

BY

DR. E. W. MITCHELL,

Cincinnati.

MANY of the atrophic children found in hospital wards are already in that condition at the time of admission or are so far advanced in nutritive disorder as rapidly to become so. There is, therefore, a wide field for prophylaxis in the work of child welfare associations, milk stations and social service departments. To extend and improve the work of organizations of this kind should be the earnest effort of every one interested in pediatrics; thus, to prevent many infants from reaching the hospital, or to send them there before neglect and bad treatment have reduced them to a hopeless state.

It is one of the anomalies of medicine that infantile atrophy is not only more common in hospitals and institutions but that it also has a worse prognosis than in private practice. Overcrowding and lack of "mothering" are some of the reasons assigned for this, but the essential cause is probably *infection.* Improper feeding is less at fault in the hospital than in the home, hence, alone can hardly account for the discrepancy. It is no doubt partly accounted for by the accumulation of the cachectic, the premature, the diseased, in other words, a great number of the "predisposed" in the hospital ward.

Since a fair proportion of the infants developing atrophy are the premature, those with undeveloped and maldeveloped digestive organs, etc., there must always be an irreducible minimum which no care can eliminate.

The enormous improvement of recent years in hospital construction and hospital management have reduced the incidence of "hospitalism." We have not far to go, however, to find children's wards in conditions far from ideal and in which atrophy develops all too commonly.

When one outlines means which may most reduce this disease he at the same time defines those things which are best for all kinds of cases.

The measures of prevention may be grouped under two headings:

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* Read at the Eighth Annual Meeting of the Association of American Teachers of the Diseases of Children, Philadelphia, June, 1914.

Hospital construction, hospital management. Proper construction facilitates good management. Efficient management may overcome the difficulties of improper construction. Free ventilation, ample air space (not less than a thousand feet per bed), above all provision for outdoor treatment, are essentials. The open air treatment of this and other infantile conditions is one of the greatest advances of modern times. The separation of young babies in wards apart from those of older children concentrates attention upon them and secures better treatment. The partitioning of the ward into compartments by low partitions is of advantage in limiting the spread of infection. Further experience must decide whether the advantages outweigh the disadvantages of this arrangement. Probably its greatest value is that it assists in enforcing the absolute separation of the articles used for each child—clothing, bedding, instruments, utensils, etc.—from those of every other. In every hospital this rule should be rigidly enforced. It is probably the most difficult of all ward rules to carry out. Its observance depends upon the thoughtfulness and conscientiousness of the nurses.

This leads us to the question of ward management. The head nurse should be chosen because of her intelligence, kindness of heart and interest in babies plus a previous thorough training in the feeding and care of infants. Careless and indifferent nurses should not be tolerated in the infant ward. The medical attendant should be an expert in childrens' diseases and should have continuous service.

The crucial point in prophylaxis is, of course, the feeding. How to secure the *one* efficient prophylactic and cure, mothers' milk, is the most difficult of all the problems of these babies. A close alliance between the obstetric and infant ward will help. The plan of having healthy nursing mothers come to the hospital and sell some of their milk is well worth trial. For those infants who must be artificially fed, the medical attendant must use all his resources. Thanks to the work of the great pediatrists of the past fifty years artificial feeding is now more successful than in the past.

Prompt attention to early disturbance in digestion, to early and minor infections may arrest a process, which allowed to proceed, would later develop into atrophy.

Feeding, absolute cleanliness, open air, devoted nurses, I would name as the essentials. System, order, cleanliness, the cultivation in the attendants of an *esprit de corps*, that leads them to cheerful devotion to their little charges, all these and more will the efficient medical attendant secure.

TRANSACTIONS OF THE ASSOCIATION OF AMERICAN TEACHERS OF THE DISEASES OF CHILDREN.

Proceedings of the Eighth Annual Meeting at Philadelphia, June, 1914.

The President, JOHN ZAHORSKY, M. D., *of St. Louis, in the Chair.*

DR. W. C. HOLLOPETER presented a case of

PURPURA HEMORRHAGICA.

J. C., aged nine. Family history is negative. Past medical history: Measles at one year. Whooping-cough at the same time as the measles; scarlet fever last February; chickenpox at the age of five years. Has had several nosebleeds. Normal birth; breast fed. He eats three meals daily and seems healthy and well. The mother has been taking him to a day nursery. On June 2 the boy had several nosebleeds. The mother came home from work on June 3 and said the child complained of pain in the abdomen; also had severe backache. The child was admitted through the accident ward and at this time was covered with purpuric spots and there was bleeding from the nose and gums. A curious fact about the child is that he has had a number of spots over his body and when these fade he has an intestinal hemorrhage, when this subsides there is a recurrence of the blue spots on the surface, showing a balance between the mucous membrane and the cutaneous surface.

In examining the mouth there is no evidence of scorbutus; the gums are thick but they are not purplish or bleeding.

Blood Examination.—Erythrocytes, 2,370,000; hemoglobin, 48 per cent.; leukocytes, 6800; polymorphonuclears, 71 per cent.; large lymphocytes, 6 per cent.; small lymphocytes, 22 per cent.; eosinophiles, 1. The erythrocytes seem somewhat smaller though normal, but uniform in size and shape.

The blood count rather shows the possibility of scorbutus. He has a blood pressure, systolic 122, and diastolic 105. A second blood pressure after the administration of adrenalin was systolic 130 and diastolic 112.

The eye grounds were examined by Dr. Fox and reported to be perfectly normal.

Urine Analysis.—Color normal; sp. gr. normal; no albumin; few leukocytes and some epithelial cells. Has had hemorrhage from the urinary tract showing erythrocytes, leukocytes and triple phosphates, with urates.

The feces show occult blood. The blood from the bowels was independent of the bowel movements. Has had nosebleed every day but no other bleeding.

On admission June 3 he was given gtt. 4 of the tr. ferric chloride every four hours and calcium lactate. The nose began to bleed and was sprayed with a simple cleansing lotion. The nose and throat was examined by Dr. Skillern but nothing was found, simply a general oozing from the respiratory tract and gums. On the 8th was given gtt. 10 of 1–1000 adrenalin chloride hypodermatically t.i.d. The purpuric spots have gradually disappeared and at the present time there is only a slight one on the knee.

The temperature has been quite variable. On admission it was 98.6°; this was on the 3rd; on the 5th it rose to 100, then 101 and then declined to normal. There has been no vomiting. The temperature rose on one occasion to 101.6; this was immediately after a bleeding.

I would like suggestions on this case. We have tried to find some hereditary taint but have been unsuccessful. Seventy per cent. of these cases occur under five years of age and 90 per cent. are in males.

For several days we have not limited ourselves to milk by the bowel. He is getting milk by the stomach. He is also taking fruit and meat juices. This was started because of the idea that there might be some scorbutic tendency.

Question.—How much milk per rectum do you give and do you add anything to it?

DR. W. C. HOLLOPETER.—We just peptonize it cold and add nothing to it.

DR. W. C. HOLLOPETER presented a case with

FEVER OF OBSCURE ORIGIN.

I am quite sure you all have been brought in contact with cases in which you could not put your finger on the exact cause of the fever. We have learned to disregard the pulse finding and respiration in regard to these fevers. This little child has had a continuous irregular fever without any definite lesion.

History.—Italian. Male, aged nineteen months. Family history is of little interest. Mother living and well at twenty-eight years. Father thirty years of age. Three sisters, eight, six and four respectively; one brother two years; all living and well.

Normal delivery, breast fed for seven months. The diet, according to the statement of the parents, has been 1 pint of coffee, 1 pint of tea, 1 pint of milk, and 3 cents worth of cakes. Child is restless and cries at night. Has had no previous illnesses. Coughs; has diarrhea with greenish-yellow stools. Does not talk.

This condition has passed since admission to the hospital and under the proper diet. The child was originally admitted with a fever that ranged from 105° to 96.4° with rapid variations. This ran about one month after the subsidence of all gastric irritation and cough. The digestive organs regained their normality and yet the fever continues. There is no evidence of any lesion. The ears and eyes are normal. The child is taking whole milk. He has not been tried without cream. He is taking about 8 ounces every four hours or 48 ounces in twenty-four hours. He has a large abdomen, which suggests malnutrition previous to his coming to us.

DISCUSSION.

DR. DOUGLAS.—Many of these cases respond when they are put on dry food without milk with hot water as a drink. As a general rule they will take a dry food and will even chew at nine months of age.

DR. H. LOWENBURG.—My feeling is that the basis of the temperature is infection in the middle ear, which may cause neither pain or discharge. I agree with Dr. Douglass that it would be a very wise thing to remove milk from the diet. In addition to the dry diet I think it would be safe to give the child starchy substances in the form of rice and animal broths. I do not think that by any means all disturbances are due to fat and sugar.

DR. SAMUEL W. KELLEY, of Cleveland, opened a discussion on the

SURGICAL TREATMENT OF PYLORIC OBSTRUCTION IN CHILDREN.

Pyloric obstructions are, in general, of four types. First, congenital stenosis of the pylorus; second, hypertrophic stenosis; third, spasmodic constriction or spasm of the pylorus; fourth, pyloric stenosis of older children.

The first variety, congenital stenosis without hypertrophy, occurs sometimes at the pylorus, as it does in other portions of the intestinal tract (apt to be at the site of the opening of the common bile duct and in the ileum). There may be narrowing, or complete atresia. It originates in a developmental failure.

The second and third kinds are the ones we have much discussed under the title "pyloric stenosis of infants" and divided into "hypertrophic" and "spasmodic."

The fourth kind, which I have for convenience called pyloric stenosis of older children may be produced by causes acting from within, such as contraction of the scars resulting from corrosive poison, from ulceration, or the wound of a foreign body, or by the plugging of the pylorus by a polypoid tumor. Recently, I saw a sarcoma of the stomach wall obstructing the pylorus. Carcinoma of this region, so common in adults is only a possibility in children. Or the causes may act from without, as by pressure of a tumor, by displacement of the stomach with angulation of the pylorus, or by constriction of bands or adhesions. It seems reasonable (though I have never personally verified it, by operation or autopsy) that hypertrophic stenosis of the infant may persist into childhood.

Some of these four types certainly demand surgical treatment. Every one of them may require it, although it must be rarely that the spasmodic case comes to that crisis when well handled by a pediatrist. It has been one of the most tantalizing experiences of my practice to have cases, which were sent to me with a diagnosis of pyloric stenosis requiring operation, improve under a change of food and management. As a surgeon, I felt myself cheated out of an operation by myself as a pediatrist. This has occurred again and again. But as soon as it has been demonstrated that the patient although properly fed and cared for cannot maintain his nutrition and advance in weight, strength and development, delay without operation is wrong.

Obviously the surgical treatment of all these conditions is too wide a subject to discuss in detail at this time. Let us mention only the treatment in the second and third types of pyloric obstruction, which are the types uppermost in the minds of most pediatrists. Briefly, this includes (1) operation upon the pylorus itself, and (2) in short-circuiting around the obstruction.

Of the operations the pylorus itself there are described pylorodiosis or stretching, by two principal methods, Hahn's and Loreta's. In Hahn's method the stomach wall is not incised but is invaginated upon the end of the little finger and gradually thrust through the pylorus. This plan is quite impossible on account of the small size of the parts.

In Loreta's method a small incision is made in the stomach wall near the pylorus and a forceps or bougie passed in at the opening and on through the pylorus which is thereby dilated. The incision is, of course, then sutured. This simple, if rather unsurgical, plan can be carried out in certain cases and some good results have been reported. But there is no certainty of opening a sufficient passage permanently and there is considerable danger of infection.

Of Finney's gastroduodenostomy, and Nicoll's pyloroplasty, I will only say that the diminutive anatomy of the infant and the short attachment of stomach and duodenum and large overhanging liver render them impracticable for these cases.

The one operation which is generally technically practicable and which secures a sufficient and permanent opening between stomach and intestine is gastroenterostomy. The majority of surgeons prefer posterior to anterior gastrojejunostomy. The mortality is about 50 per cent. It would be less if operation were not usually postponed longer than it should be. Gastrojejunostomy interferes but little with the metabolism of ingesta. In its performance the strictest aseptic precautions are necessary. If the umbilicus has been inflamed it should receive extraordinary attention in cleansing, and then be sealed over. The stomach should be empty and if distended with gas it should be collapsed by passing a catheter by the esophagus. Great care should be taken to maintain bodily heat. The room should be thoroughly warm and the table warmed and kept warm. The extremities should be swathed in cotton wool. All skin washing should be done beforehand so that the skin is not wetted at the time of operation. The anesthetist should be skilful and the least sufficient quantity of anesthetic used. Oxygen should be at hand and administered on the slightest indication. Ether is in fashion. The Murphy button and similar devices are not used.

Very small instruments, such as clamps and forceps, should be chosen. The incision is median, small at first for exploration, then enlarged if necessary, going to the left of the umbilicus. One must have some room to work; and it is better to have a somewhat larger incision rather than to pull the viscera outside through a small opening. It is best if possible to do the work without eviscerating. The wound is pulled toward the left, the colon is raised, discovering the jejunum which should be taken and no other bowel. The mesocolon being torn through and stomach and gut approximated, the Lembert line is made with fine silk. The incision for the stoma should be at least an inch long. The inside sutures are zero chromicized or iodinized gut. The anastomosis being completed, a catheter should be passed *per os* and a dose of water should be placed in the intestine. This little maneuver was suggested by F. X. Walls in a case operated by Richter, and is well worth the fraction of a minute required to guide the catheter through the stoma before proceeding to close the abdomen. Or a dose of coffee can be used, same way, or per rectum, or saline solution per rectum, or a hypodermic of camphor oil. I like the stimulant used before the babe is removed from the table. He is put in a warm bed. When he has recovered from the anesthetic he is placed almost sitting in a sling. Feeding is begun early by the mouth. It is a mistake to wait a minute, after the danger of vomiting is past. The food is whey. Brandy is given as indicated. Reaction is apt to be sharp, temperature going up promptly to 103°, 105° or 106° F., but in favorable cases this soon subsides.

DR. H. LOWENBURG spoke on

PERISTALTIC WAVES IN PYLORIC OBSTRUCTION.

A child came to my clinic at the Mt. Sinai Hospital on May 6 with a history of vomiting and loss in weight. It was at that time breast fed. Nothing associated with the family history of any moment and the mother came thinking that her milk was at fault and wanted to remove the child from the breast. The association of a breast-fed child and the mother wanting to remove it from the breast on account of vomiting in my experience with fourteen or fifteen of these cases has been very common and is always suggestive of pyloric disease. It suggested it in this particular baby and examination reveals it. The degree of obstruction, however, was not absolutely complete, the clinical symptoms, however, were all present and it is for this reason that I present it to you. The vomit is characteristic, is forceful and gushes out of its mouth sometimes immediately and sometimes one-half hour or one hour after eating; it is constipated but constipation is not complete. There is a certain amount of milk feces which comes through. There is a palpable pylorus and it also presents the peristaltic wave. Its weight has suffered.

I believe this child belongs under the category of nonsurgical cases for the reason that it gains then loses in weight. Purely by accident I have noted that in the cases that are operated upon you get a weight chart that resembles the crisis of pneumonia. On the other hand, in the cases which belong in the nonoperative class you get a temperature which resembles the curve of intermittent type of temperature or continuous temperature with remission and intermissions. This baby when it came to the Mt. Sinai Hospital weighed 6 pounds. At present the weight is 6 pounds, 7 ounces. It has gained up to 6 pounds, 9 ounces, then to 6 pounds, 4 ounces, then 6 pounds, then 6 pounds, 8 ounces, and then 6 pounds, 7½ ounces. It has a more or less stationary weight and its general condition is fair. I believe this baby a nonsurgical case for the reason that the weight is more or less stationary and that the strength is being maintained. I believe these cases should be determined operative or not from the clinical symptoms. The fact that pyloric obstruction is present does not mean operation. I have seen cases get well in which the pyloric tumor was palpable. There is no doubt about this in my mind. I think that the pylorus more frequently is in spasm and this spasm may be palpable. Pyloric stenosis is a bad term. You may get a case that is operative in which there is no hypertrophy and in which the spasm is so complete that little or no food passes the pylorus. I have the *x*-ray plates of six cases. If you inspect these plates you will notice that the bismuth appears like a comet. These two plates only show that no bismuth has passed through after three hours but after eight hours a little bismuth trickled through. These pictures are also pictures of an operative case. In all no bismuth has left the stomach. In this picture you can see the stomach as it was going through its peristaltic activity.

Dr. L. R. DeBuys, New Orleans.—Dr. Lowenburg's case was similar to the one I reported last year and to which he referred this morning. I do not believe any of these cases of pyloric obstruction are surgical until they have been proven nonsurgical. They should be given a chance. Many cases, I have no doubt, have been spared on operation when they have come under observation early. It is then that we can do much for them.

The unfavorable cases are the ones which come to us late and are not only unfavorable for medical but surgical treatment as well. The rule that I follow is that as long as a case is stationary or gaining in weight, it is growing older and for each ounce it gains and for each day it lives, its resistance becomes greater, so that if ultimately an operation is needed the baby will be able to stand it better and the outcome will be more favorable, because the case will then be a better surgical risk.

Dr. Holmes.—Many cases of pyloric spasm clear up medically. Pyloric stenosis when it is as marked as in Dr. Lowenburg's case seems to me to be getting pretty close to the surgical line.

Dr. Copeland, Washington, D. C.—The ideas expressed here to-day are gratifying to me because my own ideas are along the same line. I am not in favor of surgical interference with these cases unless absolutely needed; I believe that many cases are not recognized.

I have seen a number treated surgically and an adequate opening made and even then the response was poor I think if we could only solve the etiology of these cases we could treat them to a better advantage: is it true hypertrophy, or spasm, or is it not a combination of the two with the spasm predominating? I should like the doctor to tell us something of his diet in the medical treatment of these cases, just what he uses with regard to fats, carbohydrates and sugars.

Dr. McClanahan, Omaha, Neb.—I differ somewhat with some of the opinions given and shall give my reasons for so doing. I have also seen cases that I am confident were purely spasm of the pylorus. Now the problem is as to the line of differentiation. In the first place, I believe that if there is congenital hypertrophic stenosis and the infant is losing in weight there should be no delay in operation. I believe our surgeons are more efficient than they were some time ago. Of five operated cases out of nine, four recovered and one died, the other four died without operation. Of the four cases which recovered all were operated upon before they were in an extreme condition. In one of these cases the vomiting did persist for two or three weeks after the operation. I have drawn this conclusion: if in a given case I have a peristaltic wave, the baby is breast fed and if the stools do not contain evidence of milk digestion then I believe that the pylorus is closed. I have another theory that all of these cases are congenital. The development of HCl rapidly increases pyloric spasm. Another thing that I believe is that a great many men overlook these cases and then again I have no doubt that men like Dr. Lowenburg and others with the *x*-ray will give us further light in them. In cases of spasm of the pylorus without stenosis my experience is that these babies have a great deal of pain, while in cases of hypertrophic stenosis babies throw up after eating without any pain whatever. In conclusion: When I have a wave and progressive loss of weight and when there is no milk in the stools then I say let us operate. When we have a stool that is brown or greenish brown, without much odor, which stains the napkin and has no curds, then we are sure there is no milk in the stool.

Dr. John Zahorsky, St. Louis, Mo.—Saunders of St. Louis was the first man to demonstrate pyloric stenosis clinically and postmortem in the United States. Dr. Saunders being pioneer in this line we in St. Louis rather pay special attention to what he says. These are his usual methods of treatment: He takes them off of breast milk, saying that breast milk is the most powerful agent we have to produce peristalsis and spasm. The next thing he does is to use lavage. The third procedure, and this is what he insists upon, is this: We know that physiologically the pylorus closes tightly when we swallow and he attempts to get rid of that impulse by eliminating the act of deglutition, therefore, the baby is not permitted to nurse the breast or bottle but is fed by gavage. Another point in feeding is to give foods which will not coagulate in the stomach, such as peptonized milk, whey or cereal decoctions, such as oatmeal water, barley water, etc. Lavage, gavage and feeding of food which does not coagulate in the stomach, and maintaining weight are the cardinal points. If you can put in 2 or 3 ounces in one feeding and in two or three hours you recover this without any change then you know that nothing is going through and this is the best diagnostic test. Of course, I do not mean that other signs should not be used. If you find the baby after two or three days is getting a moderate amount of food through the pylorus then it is proper to wait. I saw one case treated in this way which recovered and when five months old died of pneumonia and on autopsy we found a large muscle at the pylorus which was thick and large, but was relaxed. This is the question: how can we relax these muscles?

Dr. Lowenburg (in conclusion).—Like every one who sees a great many children suffer from malnutrition I am very much interested. I think my experience covers nineteen cases, five of which were operated upon. It is very difficult it is true to come to a conclusion as to what is an operative case and what is not. I find myself in accord with Dr. DeBuys in so far as I believe these cases must be regarded purely in a clinical way, that is—we must forget whether we are dealing with a hypertrophied pylorus, or spasm of the pylorus, but we must remember that we are dealing with a case of pyloric obstruction and it is the degree of that obstruction which determines whether or not the case will be operative or not. I believe where pyloric spasms continue too long and the nutrition suffers therefrom cases should be operated upon. It is perfectly possible by studying these cases to decide whether or not the obstruction is sufficient to warrant operation, whether they are going to starve to death or whether the food is going through enough to maintain the proper balance. The cases that are operative go back and from the time you get them their loss in weight is progressive. On the other hand, in cases where the obstruction is marked one day and less another the weight chart is one of remission and intermission and not of marked depression. The degree of constipation is an important factor. If you have a few feces coming through you should watch the case and be guided by its weight and strength. There may be even some food going through and yet it may not be enough to maintain tissue balance. The *x*-ray is a valuable means of determining the degree of the patency of the pylorus. For this the administration of charcoal is a simple and valuable method. Give 10 grains and the next morning wash the stomach out and if you get a great deal you know the pylorus is tight. Watch the diapers and determine by this also. I have seen cases where I thought I would operate and the next day I would think that I would wait. It does not matter whether the obstruction is a spasm or hypertrophy the stomach has work to get the food by. We must be guided by the condition of the child, by the clinical symptoms and not by the pathological lesions. We should stop talking about pyloric spasm and hypertrophic stenosis, but we should speak of pyloric obstruction, partial or complete, dependent either upon spasm or hypertrophy or both. As to the diet: All of my cases occurred in breast-fed babies. I do not know of the work of the gentleman of whom Dr. Zahorsky spoke but I myself noticed that some of these cases that recover without operation will change in weight when you place them on other than breast milk. You should keep the fats low. I always use cane sugar. Sometimes I use maltose but I do not believe sugars cause much disturbance. I often use the old-fashioned flour ball administered with milk. Frequent but small feedings I think we should use. I use bromide of strontium before feeding. Sometimes I use morphine gr. $\frac{1}{2000}$ and citrate of sodium in the milk. I also use washing of the stomach. The point that Dr. Zahorsky made about swallowing and intestinal spasm is interesting on the face of it but I cannot see that feeding by the stomach tube would overcome this because when you put a tube in a baby's throat he gags and receives a terminal irritation which is far stronger than swallowing.

CLINICAL PRESENTATION OF CASES OF CONVULSIONS.

Dr. H. M. McClanahan, Omaha, Neb.—This boy is three years of age. Came to me last March from Virginia. Full-term birth; normal; no asphyxia. One other child six years of age living and healthy. No history of miscarriage. Family history good. Father's mother died of cancer of the uterus; father's father died of tuberculosis. The child was nursed for three or four months and then breast and bottle fed up to one year. Dentition occurred when five months old and he walked when he was fourteen or fifteen months old. During this time he had indigestion. Tonsillitis when eighteen months old. Appetite good; bowels move once a day and when he came to the hospital he was getting a small amount of meat but his diet was largely milk; occasionally a small amount of candy, fruit and green vegetables. On January 27 of this year he had a temperature of 102.5. This attack came on suddenly and one-half hour afterward had a convulsion, one at 2.30, one at 4.00, and one at 8.00 o'clock, were clonic in nature. The temperature remained 102.3 for two or three days but was normal on the fourth day. In February he complained of dizziness and would fall over to the side and in twelve hours he had a return of the convulsions, about eight in number. The convulsions did not begin in any one location or part of the body and there was no fever or vomiting. Stools one a day—dry and constipated. At this time had a little vertigo and falling over again followed by convulsions, eight attacks every three hours. March 1 the symptoms and convulsions returned and continued until March 10. At the last attack he articulated very indefinitely and for one-half minute at a time he could not say anything but would try. His speech would return but it would not be normal. He has a bright, happy disposition and there is no history of a fall. Occasional mucus in the stools but after his first attack or first series of convulsions the diet was regulated and he had irrigations of the colon every day, from 1 to 3 pints of normal salt solution. No convulsions have been followed by stupor or drowsiness. On March 24 there was nausea for some hours followed by the vomiting of his breakfast. On March 26 two attacks not followed by drowsiness or stupor. Feces and urine retained during the attack. On March 27 had had two or three stools in twenty-four hours. There is no Koenig's sign present. He has received daily irrigation of the bowel since the first attack. March 28 was the first attack in which I saw him. The convulsions lasted forty seconds. He fell over to the right while sitting in bed. There was disturbance in speech and confusion. March 24 there were four attacks in twenty-four hours: three of the face and one of the entire body. One hundred grains of bromide were given in the twenty-four hours. Wassermann test negative. Faint trace of albumin in the urine with a few casts but we think this was due to metabolic disturbances during the attacks. Blood culture was negative. Moro test was negative. The urine was voided involuntarily once while in the hospital. Blood count showed 16,400 leukocytes with a little excess of polymorphonuclears. After the spasms the urine showed a very few granular casts but no albumin. The stools failed to show anything of the nature of blood or pus; no special or foul odor; no parasites in the blood cells and very few leukocytes. We had an *x*-ray taken of his head and it shows that the posterior coronoid processes are unquestionably enlarged. Whether this may possibly interfere with the circulation in this portion of the brain and have something to do with the recurring attacks is the question which at that time entered into our diagnosis. The question, of course, is the etiology of these convulsions. After leaving the hospital and returning home he was given 3 grains of antipyrin in the daytime divided into two doses; potassium iodide 3 grains, three times a day; and sodium bromide, 3 grains, three times a day. He has not had any attacks since leaving the hospital. He has had at intervals of one or two weeks little fussy periods where he would be irritable and restless and during these periods he is extremely irritable and difficult to manage and seems to have poor sleep and bad dreams.

Heart and lungs are normal; there is no glandular enlargement; normal-shaped head, fontanelles closed. Altogether physically he is, in my opinion, normal. Therefore, in my judgment the question narrows itself to this: A child which seems perfectly well has convulsions and these convulsions seeming to be localized or focal in character, you would think of a cerebral origin. Tumor would be ruled out by the absence of headache and eye-ground symptoms. We find his cranial nerves normal, therefore, I believe there is some disturbance in the higher cerebral centers and, if such is the case, what can we do? First, give a carefully regulated diet and keep the bowels and kidneys active. Provide for from two to four hours rest every day aside from the night rest. In the next place push the iodides to ptyalism; I believe sodium iodide is the best form. I should also advise urotropin say for ten days each month.

Dr. Douglas, Detroit, Mich.—What do you mean by a careful diet?

Dr. McClanahan.—Fruits and fruit juices; stewed fruit once a day, also raw fruit once a day; broths; green vegetables; bread and butter, milk in moderate amounts.

Case II.—J. D. Aged five years. Birth normal. Three and one-half months ago had first convulsion. Three weeks later six convulsions in twenty-four hours. One month later eight convulsions in twenty-four hours. Ten days later twelve convulsions in twenty-four hours. There is usually one hour between the convulsions. Sometimes she will go to sleep between them and sometimes she will vomit. Has had chickenpox; measles; whooping-cough. Had no spasms during the whooping-cough. Had an abscess of the knee. Never had any soreness of the mouth or at the rectum. Began to walk at seventeen months; talked at three years of age—talks quite a little now but in the excitement she gets her words mixed up. There is nothing wrong with the heart or lungs. The child appears rather dull, and I think is slightly defective. It has the deep narrow palate which is usually considered an indication of degeneracy. The convulsions coming on in the night without apparent cause almost certainly mean epilepsy. There is no known history, however, of epilepsy in the family.

Case III.—M. S. Eleven years old. Was always very well as a baby, no spasms. Was a breast baby for fourteen months. Had measles, chickenpox and whooping-cough. Is now in the tenth grade in school, and progresses with her class very well, keeps right along with children of her own age. First convulsion three years ago. Since then they have come on every two or three weeks. Has had no convulsions, however, for sixteen months. She frothed at the mouth and bit her tongue. The spells were all at night with the exception of one in the morning. She would be in bed one hour and go to sleep and then waken and go into a convulsion. After the convulsion she would sometimes go to sleep or sometimes have a bad headache. Sometimes she would vomit but used to be all right the next day.

The father's parents died of tuberculosis. The mother's parentage is negative. There are four other children—two older and two younger—all are well.

This child in contrast to the other case seems to be normal mentally as well as physically. Convulsions without apparent cause are usually of central origin and, therefore, epilepsy.

Treatment.—Some toxin in the intestinal tract may be the exciting cause. Try and keep the intestinal tract in as good a condition as possible. Gray powder once a week does very well. Sodium sulphate in the morning before breakfast in a little lemon juice often will prove beneficial. In addition to this the bromides should be pushed energetically.

Dr. DeBuys.—Has a test been made of the kidney function? Is the phenolphthalein test normal? What does "hot southern diet" mean?

Dr. Douglas.—I have no exception to make to any of the cases. They are all interesting to me. At the present time I am going through a siege of these cases. One child I had whose mother was very proud of him, but fed him too much. He became very heavy and tall and the mother would remark that he ate so much. He developed convulsions. I thought first it was diet and warned them against it. They happened to have a maternal father who was epileptic. They called in his physician but the convulsions still continued. Another physician came in and gave some medicine and the convulsions stopped and he told them they would never come back. The convulsions, however, did come back again and I was rather pleased to see that their eyes were being finally opened, regarding the diet question.

Another case was that of a little girl, thirteen years old; very fat and plump. She lived in an orchard and ate a great deal of fruit. She had convulsions in the night. Regulation of the diet in this child reduced the convulsions. They, however, occasionally occurred in a mild way. Another little girl of the same age would have an attack after eating a big supper. She suddenly became very dull. She was doing very well but she would know that she was having just a little attack in the daytime—petit mal. In regard to the two little girls they are better but are not cured. They have grown very tall. I insisted upon a careful diet and to avoid any excess of the line of which they were fond; all fruits and candy were cut out because they liked them most. Both of these children I gave a certain amount of thyroid. I thought if they would get a different line of development they would get rid of this nervous strain. With the administration of this drug I have found both of these children materially relieved. I made no promise but they were certainly benefited and improved and the impression with regard to the use of the drug was that they received benefit from it. Both have changed in physique wonderfully. They are tall and less fleshy. There is an indefinite and uncertain future before them, however.

Dr. Graham.—The point you brought out about the posterior clinoid processes is interesting. There has been considerable literature upon this point and the enlargement of these processes may have something to do with the etiology, they do interfere with the neighboring portions of the brain. The second case is epilepsy associated with idiocy and the third is plain epilepsy.

Dr. McClanahan.—In regard to the *x*-ray I know very little about it. I hope it may demonstrate something. The history of the first case of Dr. Graham's shows irritable spells. This is significant of cortical irritation. I feel that that boy should be twelve years of age before I would feel safe about my prognosis. With regard to the "hot southern meals," would say that I mean all sort of hot breads, corn cakes, etc., and these twice a day. I am satisfied that nine out of ten cases of convulsions in children under three years of age are due to the gastrointestinal tract. In these cases the clearing of the bowels removed the convulsions.

A CASE OF ACHONDROPLASIA.

Dr. L. R. DeBuys, New Orleans.—F. K.; two years old. Difficult birth; full term. First child. Breast fed for one and one-half years. First tooth at eight months. Father's mother healthy; mother's father died of cancer of the stomach. Three months before the child was born the mother slipped from a trolley car and was in bed one day, but went to work the next day. When born the arms, legs, chest and back were deformed. Weight 13 pounds. Does not take milk and is constipated. She does not seem very dull mentally and recognizes her parents. She says some words in sentences and understands when talked to. The deformity is no better nor worse. As you see there is a body that is entirely disproportionate—the long trunk and short legs. These cases have been known through history and in art and were described by Parrot as a clinical entity in 1878 and he it is, from a study of thirteen cases, who termed them achondroplasia. Achondroplasia is a misnomer as it is not a condition in which there is an absence of cartilaginous or bone formation as achondroplasia would mean but a delayed ossification. The abnormalities are due to a disturbance in the process of ossification in primary cartilage.

The *x*-ray plates show the diaphyses of the bones involved and not the epiphyses. At this age in rickets there is much to show from a radiologic standpoint, particularly that the fault is in the epiphyses and not the diaphyses which causes the enlargements at the ends of the long bones, and in the shaft there is definite thickening of the periosteum and a thinning of the cortex. No satisfactory observations have been made in congenital rickets. In achondroplasia the diaphysis is spread in a cup-like manner and there is an overgrowth of the periosteum at the diaphysis causing this enlargement. The shafts of the bones are short with thick periosteum and thick cortex and sometimes a narrow medullary canal. In the cases of osteogenesis imperfecta we have a very little cortex and a thin periosteum. This case shows a widening of the diaphyses of the long bones clearly.

The deformity in these individuals is because of the extremities being shortened and the trunk normal in length. The pelvis is sometimes flattened. In the older cases we get a prominence at the muscle attachments particularly marked at the deltoid insertion. In rickets we have "bosses" while in this condition we have not. In this condition we get the pug-nose which is due to a shortening at the base of the skull due to the early ossification of the tribasilar bone. Other characteristic evidences are seen when the patients become older. They show a typical clinical picture which I will illustrate in some photographs I have brought with me.

A second plate shows the prominence at the attachment of the deltoid which in the adult cases of this disease is more marked. Sometimes there is a lateral flattening of the thorax at the junction of the ribs and cartilages. The shaft here shows chiefly periosteal bone. Sometimes in places the medullary canal is replaced by hard bone. The photographs I show are not of the same patient from whom the radiographs were made, but are from other cases. They show the typical clinical picture of long trunk and short legs; large head, pug-nose; bowed extremities; trident hand; lordosis; prominent abdomen; and decentralization of body as manifested by the umbilicus being below middle of body.

These cases do not respond to drugs or glandular extracts so far as we know.

Dr. McClanahan.—Does it occur in the colored race?

Dr. DeBuys.—There are no races of white dwarfs. There are races of colored dwarfs, however, such as the Akkas of Central and southern Africa; the Mincopies of the Andaman Islands; the Semangs of Malacca; and the Ætas of the Philippines. I had occasion to see two of the Philipino dwarfs and I believe they belong to this group. Their bodies were long and their extremities short as in these cases.

STILL'S DISEASE.

Dr. Graham.—I do not know the etiological factor in this case which was sent to me two months ago from Cambria County, Penna. At that time he was six and one-half years of age.

Family History.—Mother living and well. Father died at the age of fifty-one years as a result of operation for gall-stones. A sister, nine years of age, is now in the hospital.

Personal History.—Breast fed; dentition at ten months. The birth was normal. Walked at eighteen months. Scarlet fever at twenty months followed by cervical abscesses that lasted for two months. Has had measles, chickenpox and pertussis. Was always a strong child up to the beginning of the present illness. Thirteen months before we saw him in March, which would now be sixteen months ago, the child was exposed to cold and the next morning the mother noticed a swelling of the right knee. A physician was consulted immediately. Three days later the child complained of a sore throat and a diagnosis of tonsillitis was made.

At this time he had some difficulty in breathing and shortly afterward a double pneumonia was diagnosed. The patient went through this which was followed by a double empyema and a rib was resected on either side and pus evacuated. These openings closed within two months and the child was in good health until July last when the fever returned and another resection on the right side was done which did not heal until last October; since that time the patient has been in fair health until two weeks ago when his left knee became swollen and tender. The right knee has been swollen with fluctuations of improvement and retrogression. Since the onset this right knee has changed most. There appear at times swelling of the muscle. The appetite is good. At one time he was troubled with a certain amount of indigestion. Bowels move daily. The swelling since it has reappeared has never entirely disappeared. At times the swellings appear on his head and the back of the neck. These swellings when they appear on the head last from twenty-four to forty-eight hours. *X*-ray plates have been made of his knees, of his wrists and of the head and upper vertebræ but we cannot find any pathological changes in these bones. About three months ago he held his head low and has had a brace to hold his head which has helped him considerably. The blood and urine show nothing. The Moro test is negative. Stools show nothing abnormal. We aspirated the wrists several times and injected guinea-pigs with the fluid and the animals were killed at different times but nothing was found. Eye-grounds are normal; reflexes and gait normal and from the x-ray plates we probably come to the conclusion that it was not an infection. We told the mother we could not make a diagnosis.

Treatment.—Regular diet; keep him out of doors; massage, and internally the iodides.

There are no demonstrable changes in the bones or cartilage or the tissues. He has had endocarditis, pericarditis, and has a distinctly deformed chest. Has had one attack of tonsillitis.

DR. ZAHORSKY.—I personally had a similar case several years ago. It gradually improved after two or three years. I felt in that case it was some modified rheumatic infection.

DR. L. R. DEBUYS, New Orleans.—I have two such cases now under my observation which belong to the type of disease described by Still.

In one case, I had the tonsils removed two months ago, and the patient seems to be much improved.

ADDRESS WITH LANTERN SLIDES: "BONE LESIONS OF SCORBUTUS."

DR. JAMES S. STONE, Boston, Mass.—The problems of which I intend to speak to-night of the diseases of bone are among the most fascinating with which we have to deal. The factor of growth is one which is to be constantly considered.

The growth in length is by pushing away from the epiphyses; the growth in diameter is exactly analogous to the growth of a tree, the deposit of new bone under the periosteum being the exact way in which the tree grows by deposit of wood under the bark. These factors of growth—that is, the periosteum and the epiphyseal line, play an important part in the bone diseases of children. It makes no difference whether the trouble be one of nutrition, or infection, or trauma. In the traumatic diseases, of course, the fractures come first. We often speak of green-stick fractures in children. The term green stick practically I like to confine to a perfectly definite type of fracture in which the break is such as occurs when a green stick is broken over the knee where the concave cortical layer of the bone is bent and where the convex cortical layer rips apart; this is the true green-stick fracture.

Much more common, and what is being more frequently recognized, is the subperiosteal fracture which is the break under the bark and which is analogous in young children to the break of the green twig as compared to the break of the trunk of the tree. The strength of the wood in the green twig is little while the strength of the periosteum is very great. When a tree is blown over the bark does not hold at all, but in the green twig the bark holds a great deal. In the adult bone the periosteum holds very little, while in children the periosteum holds a great deal and this is the explanation for these subperiosteal fractures. Then again in children you occasionally see what you do not see in adults—buckling of the bone where the cortical layer buckles in—a form which is never seen in adults. In addition to the fractures there are the epiphyseal separations. The epiphyseal line is mechanically weak but it serves as a great protection to the joint, so that not only is there a disadvantage to that weak spot but there is an advantage in so much as it tends to divert a fracture away from the joint, and this fact together with the large size of the epiphyseal cartilage tends to lead to very little joint limitation and motion after a joint fracture as compared with limitation and motion due to the ripping and tearing of the synovial membrane and the articular cartilage. Where there is a great big cartilaginous epiphysis it acts as a cushion and prevents injury to the joint in children. The weakness of the epiphyseal line also renders it a point of diminished resistance to bacterial infection so that in the child the infection may not start in the epiphyseal line but may start in the epiphysis and because of some slight trauma which may have diminished the resistance to that point and made some slight hemorrhage there it may in that way give the nidus for the infection to start; but there again, that epiphyseal line is a line along which an infection may spread easily and may divert the infection from the shaft of the bone and thus save the shaft whereas, in an adult, where the epiphyseal line no longer exists the infection starting near the joint must necessarily be an osteomyelitis.

In the same way there may be the diseases of nutrition and infantile scorbutus which are the types of which I wish to speak to-night. The chemistry of infantile scorbutus is unsettled. The lack of freshness in the food is regarded as the causative factor. This particular case is so unusual and so extreme and presents so many atypical facts that I mean to speak of one case alone because it shows more clearly than any other case of which I know the entire history and course of this disease.

DISCUSSION.

Dr Graham.—During this last year I have had two of the worst cases of scorbutus I have ever seen. The *x*-ray plates showed a periosteal thickening to be largely in the shape of a triangle and not the periosteum to be stripped in the almost eliptical shape that Dr. Stone's most unusual case shows. I would like to know whether such a formation of the blood sac is in Dr. Stone's experience common or is it altogether exceptional or have his plates and slides been taken in such a way as to show this. I have always supposed that the lesions starting in a very small point gradually strip the periosteum back and that the thickness of the clot over the bone is in direct proportion to the site of the lesion.

Dr. Gengebach.—You cannot always judge of the extent of the bone lesions from the external manifestations. I recall a number of cases, one in particular, which had the marked mouth and gum symptoms and also very marked discoloration under the eyes which we do not often see. It looked like two black eyes. The *x*-ray plates were of the type of Dr. Graham's. The bone manifestations were slight and the external manifestations were marked.

DR. L. R. DEBUYS, NEW ORLEANS.—All cases of scurvy do not run as uniform a course as one is led to believe. Dr. Stone's case recalls one I reported two years ago; a case of exophthalmos in scurvy. The literature has only thirteen such cases. The hemorrhages were behind the eyeball and subperiosteal within the orbit, and while the lesions in the bones were not to be compared with the lesions described by Dr. Stone, yet they were present. These cases show that one symptom or another may stand out above all the others.

DR. DOUGLASS.—I can endorse what has been said regarding these papers. The picture is a lesson; very unique and very impressive—it impresses the importance of the disease upon us. I have been accustomed to these cases and seeing their lesions but never had such an impression of the magnitude of the disease.

DR. STONE.—Practically before any clinical manifestations of the disease occur the *x*-ray shows the epiphyseal line and that marking persists long after the disease is cured clinically. It is a point not yet settled that the presence of that line is a very definite and probably pathognomonic symptom of scorbutus, where it is found the treatment can be started promptly and thus bring about a very rapid disappearance of all clinical symptoms.

THE ADVANTAGES OF THE HOME IN THE TREATMENT OF SICK INFANTS.

DR. H. M. MCCLANAHAN.—Primarily the infant hospital is used for two purposes, first—for the care of the infant deprived of its mother and father; and second, the infant hospital is for the scientific study of diseases which cannot be studied in the home. For this purpose it is invaluable.

The advantages of the home are that the infant receives the constant mothering that it cannot receive in an institution, and there is something in the nervous system of the infant that absolutely demands that which we call mothering. Observation shows that it is not true only of the human infant, but of animals as well. The home therefore in the majority of cases is the place for the sick infant and it is well that it is so. As physicians it would be more convenient for us to have them in the hospitals, but this is not the question; the question is the welfare of the infant. For instance, the hospital is better than the home in many surgical cases, but this is only temporary; also in contagious diseases the hospital is better than the home.

It is not better for the individual, but safer for the community. In pediatrics I do not think the day will ever come when the pediatrist's work will not be largely in the home. I have profound respect for the American mother and there is something in the human infant that demands the mother's care.

The advantages of the home are in the first place that this is where Nature and Providence designs that the infant should be, and second it should not be taken out of the home except for poverty, surgical or contagious diseases. The hospital is for the study of disease as well as for the welfare of the child as an individual.

THE MOST IMPORTANT CAUSATIVE FACTORS IN THE HIGH MORTALITY OF INFANTS IN HOSPITALS.

Dr. E. E. Graham.—This subject may be divided into two categories, first—the mortality from the standpoint of the infant, and second—from the standpoint of the different hospitals.

In the first place it makes a difference how old the child is when it goes in—the older the child the better the chance it has for its life. Next, its family history is important: tubercular or luetic history being against it and its previous care has a great deal to do with its hospital life. The length of stay in the hospital makes a difference—I endeavor to get them out of the hospital as soon as possible. An important factor is to get them into the hospital as soon as they are sick and get them out as soon as they are well—this has a great deal to do with the mortality.

The hospital nurse should have special regard for the personal hygiene of the child and the clothes. This, of course, takes a great deal of time and it is often overlooked by the nurse: it means careful individual instruction such as should be given to a nurse in private practice. The food is an important matter. Childrens' hospitals I think have good food; they all secure good milk and cream. The feeding of these children as soon as possible with breast milk I think would increase the efficiency of the hospital. We have a mother come in two or three times a day and nurse her child and we take a great deal of trouble along this line. Mothering is a very important function in the saving of infant life. The plan of ward management Dr. Zahorsky showed is probably the most important function in avoiding hospitalism, that is—the changes of rooms, day and night. In all hospitals we should have an extra ward and it should be put in use as often as possible. In all hospitals there should be one ward ready and clean for immediate use. One of the reasons why these infants die in hospitals is they do not get the special care of the attending physician. This age baby does not get it. You do not sit down and have each baby brought in front of you, stripped, weighed and see the napkins, etc. I find I can see a great many babies if I get my nurse trained to bring the children each and every one to me personally and study it individually. We often treat thirty or forty cases in a ward as a group, probably all feeding cases, but not individually. We must stir up a certain amount of enthusiasm among the nurses and resident physicians. The use of nursery maids in the ordinary children's hospital is an advantage; they do a great deal of the work that the trained nurse dislikes to do, and it works most satisfactorily.

At St. Vincent's Home and in the Philadelphia Hospital they have the wet nurse and a large number of infants are saved because of this. The system of wet nursing is increasing. The social service worker is an enormous help in the prevention of infant mortality: she follows every child that leaves the ward and outpatient department and we have a very excellent system of knowing whether these children receive the proper care at home. She provides help for those that are unable to pay and sees that the child really gets what it should get.

An important factor is the observation ward: the only way to prevent infections is by the observation ward. Another important factor is the small ward in which infection is cut down, generally by isolation. The combination of all these factors helps the reduction of infant mortality in the hospital.

The following papers were read:

PROBLEMS OF THE FOUNDLING HOME.*
by
JOHN ZAHORSKY, being the President's Address.

THE BEST ARTIFICIAL FOOD MIXTURES FOR THE HOSPITAL INFANT.*
by
DR. H. LOWENBURG, Philadelphia.

THE PREVENTION OF INFANTILE ATROPHY IN HOSPITALS.*
by
DR. E. W. MITCHELL, Cincinnati.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Subacute Atrophy of the Liver in Childhood.—R. A. Chisolm (*Brit. Jour. Child. Dis.*, 1914, xi, 397) states that acute yellow atrophy, or, more correctly, acute diffuse necrosis of the liver, is a rare disease at any age, but is by no means unknown in childhood. The subacute form is less striking in the clinical picture it presents than is the acute type, and is therefore less likely to attract attention; and, secondly, the symptoms and signs are uncertain in their significance and far from pathognomonic. The writer has found nine cases in the literature. Taking the cases as a whole the justification for separating them as a group from the acute form of the disease, between which and cirrhosis of the liver they form a connecting link, is partly clinical and partly pathological; clinically the distinction lies in the greater duration of the case and the less violent nature of the symptoms; pathologically in the evidences of the attempts at repair that we find in the liver. As Milne points out, both the subacute and the acute types start as an acute general necrosis of the liver parenchyma; in the latter the process is so severe that the patient dies before repair can be attempted; in the former the attempts at repair and regeneration of the liver parenchyma are evident in the

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* For original articles see pages 826, 844, 848.

hyperplasia of the liver cells and the formation of new bile ducts. As the disease presents a series of gradations between declared acute yellow atrophy of the liver and cirrhosis, the diagnosis must obviously be at times difficult or almost impossible. From the former the differentiation depends on the longer history and the less acute nature of the symptoms; the presence of ascites would also be of value, while the presence of jaundice of any considerable degree and the alteration in the size of the liver while the patient is under observation, both of which signs are unusual in cirrhosis, though the latter is more often seen in the juvenile than in the adult type of the disease, would help to differentiate the case from that condition. In cases where considerable ascites is present, differentiation from tuberculous peritonitis might cause a difficulty, but the presence of even a slight degree of jaundice would be against the latter disease, in which jaundice is a rare event. From catarrhal jaundice it is to be distinguished by the greater severity of the symptoms, the gradual progress downhill and the gradually increasing depth of the jaundice. In syphilitic cirrhosis of the liver jaundice is not a prominent feature, and the course of the case is very slow, while the presence of other signs of syphilis and of a positive Wassermann reaction would help to differentiate the case from one of subacute atrophy.

Cardiac Arrhythmia in Diphtheria.—The irregularities of the pulse occurring in 120 cases of diphtheria in children under ten years of age were investigated by E. B. Gunson (*Brit. Jour. Child. Dis.*, 1914, xi, 385) by means of the polygraph. Sinus arrhythmia was constant with pulse rates below 100 per minute. Premature auricular contractions, occurring singly and infrequently, were present in 28 per cent. of cases investigated systematically and constituted the sole irregularity in mild and moderately severe cases. Three cases, fatal from toxemia, developed no arrhythmia and no heart block. Five cases, of which three were fatal, developed so called "cardiac paralysis" with marked arrhythmia due to very frequent premature contractions. In two of the cases the premature contractions led up to paroxysms of tachycardia, and in one case the tachycardia was associated with an arrhythmia dependent upon a changing *a–c* interval, which varied from 2/5 second to less than 1/10 second. Premature ventricular contractions, auricular flutter, auricular fibrillation and heart block—apart from a prolonged *a–c* interval—did not occur in this series. No case of sudden death was met with, and judging from the more recent literature in cases which are carefully investigated sudden or unexpected death is extremely rare.

Intravenous Injection of Diphtheria Antitoxin in Children.—E. H. Schorer (*Amer. Jour. Dis. Child.*, 1915, ix, 59) finds that intravenous injections produce results more rapidly and so are to be preferred in late and severe cases. Intravenous injection is less painful at the time of administration and later, and because of the smaller number of units necessary intravenous injection is much less expensive. Entrance into the jugular vein in children is not difficult and this vessel affords a ready site for the intravenous injection of diphtheria antitoxin when the median basilic and the cephalic veins are too small. A small series of cases (fourteen intravenous, seven subcutaneous) indicates that there are fewer carriers and heart failures are less likely to occur following intravenous injection, but there are more immediate and serum reactions. The immediate reactions never appeared grave and in themselves did not seem to be a contraindication to intravenous injection of diphtheria antitoxin.

Bronchopneumonic Pseudocroup.—Enrique Suner (*Jahrbuch. f. Kinderheil.*, Dec., 1914) gives the following clinical picture of bronchopneumonic pseudocroup: With the general symptoms of a bronchopneumonia there come on symptoms of laryngeal stenosis, dyspnea, lessened voice, inspiratory stridor, retraction of the intercostal spaces during inspiration, etc. These symptoms would lead one to diagnose diphtheritic laryngeal stenosis and to seek for membrane; but mouth, nose, and throat are free from any false membrane. After this stage comes on a condition of asphyxia. If intubation be performed there is a slight and temporary relief of the dyspnea, but this soon passes away and a fatal termination generally occurs, with heart failure. Fever is always present. The duration of the disease varies from two to twenty days. The causes assigned for the condition have been diphtheria generally as a complication of measles, and pneumococcus and staphylococcus infections. In measles this condition is generally an aftermath combined with bronchopneumonia. Any form of infection that will lead to bronchopneumonia may end in pseudocroup. It results rather from a certain disposition of the patient than from the kind of germ present. The inflammatory process in the deeper respiratory passages has some influence on the lining of the larynx, either by a spasm of the muscles and nerves, or through some mechanical factor. In some cases autopsy has demonstrated swollen bronchial glands at the hilus. Both lungs show lesions of bronchopneumonia with atalectaxic and emphysematous areas, and there is acute dilatation of the heart. Following measles the pseudomembrane in the lowest bronchial tubes contains Klebs-Löffler bacilli. Diagnosis is made by the initial catarrh, absence of throat and nose membranes, association of bronchopneumonia with stenosis of the larynx, and bacteriological examination. The prognosis is always bad. The author gives two rules for the treatment: use diphtheritic serum in all cases of measles followed by this complication; do not perform intubation or tracheotomy.

Circulatory Disturbances in Acute Intestinal Troubles of Nurslings.—Ad. Czerny (*Jahrbuch. f. Kinderheil.*, Dec., 1914) believes that in acute digestive disturbances in infants ending fatally we find two types of death: in one the breathing stops while the heart goes on for some time: in the other the heart stops before the breathing ends. In heart failure there has been controversy as to which heart sound stops first. As the heart sounds weaken the x-rays show that the heart shadow diminishes in size. At death it is extremely small. The author illustrates his point by x-ray pictures of two cases. A small heart shadow seems to be an element of bad prognosis in a case of intestinal trouble. It indicates an imperfect filling of the heart with blood. In both the author's cases there had been a great loss of water by the bowels. Thus the blood would be thickened and the normal quantity of blood diminished. The heart findings in these cases are symptomatic of severity of the disease. The blanching of the skin in these cases shows the determination of the blood to certain portions of the vascular system. The abdominal organs become filled with blood, especially the liver, which becomes enlarged. The diminution in size of the heart may depend on a disturbance of action of the diaphragm. The author's conclusion is that the small heart shadow results from an alimentary toxicosis, producing abnormal contraction of the heart muscle, combined with an irritability of the circulatory system. These children have an abnormal feebleness of the heart, vessels, and diaphragm action. When we see that in some cases of digestive disturbances the heart is enlarged and in others smaller, according to the shadow found, we should not wonder that the same medication does not always have a similar effect in different cases.

So-called Erythroblastosis.—H. Chiari (*Jahrbuch. f. Kinderheil.*, Dec., 1914) says that congenital dropsy is frequent and has often been described, but there is a kindred condition which is not the result of any syphilitic condition of the liver, of fetal peritonitis, of failure of circulation, or intestinal deformity. Another group of ascitic conditions is due to anomalies of the heart or blood-vessels or of the uropoietic system of the fetus or of the mother. The form to be discussed has been called erythroblastosis. This is due to an abnormal exchange of materials during fetal life. The fetus is here prematurely delivered and shows anasarca. The placenta and cord are also edematous. On section the spleen and liver are found enlarged, and microscopically both organs show numerous erythroblasts and other myeloid cells without and within the blood-vessels. In the liver the cells and in the spleen the follicles are absent. In the kidneys, suprarenals and lymphatic glands are similar abnormal changes in the blood cells. The blood shows an enormous mass of erythroblasts with a basophile protoplasm; the nucleus is often in mitosis. Schridde calls this a high-grade anemia with reparatory hematopoiesis not due to syphilis. He believes that dropsy in the mother has nothing to do with this, but the cause is probably a pathological metabolism of the fetus. W. Fischer thinks it due to a toxic material whether due to the condition of the mother or of the fetus is unknown. The author describes a case observed by him. He believes this to be toxic edema of the fetus. Abnormally increased fetal hematopoiesis may be more frequent than has been thought. This increased abnormal hematopoiesis may account for the persistence of fetal hematopoiesis in the liver and spleen in congenital syphilis.

Are Institutions for Children Necessary?—H. D. Chapin (*Jour. A. M. A.*, 1915, lxix, 1) says that the stay of an infant in a hospital should be as short as possible. Unless the infant is quickly discharged after the acute symptoms have subsided, there is nearly always a slow but progressive loss of weight which bears an inverse ratio to the age, being especially marked under six months. If this atrophy gets beyond a certain point no change of environment or food will save the patient. Another danger consists in the spread of specific infections, such as diphtheria, pertussis and the exanthemata. Perhaps the greatest danger in keeping sick infants long together, comes from the ordinary ward infections. The mucous membranes usually bear the brunt of these infections. We may thus have rhinitis, pharyngitis, tonsillitis, otitis media, bronchitis, bronchopneumonia and vaginitis, the latter nearly always specific. The multiplication of infant's hospitals through the country should not be encouraged. As concerns the care of foundlings or abandoned infants in institutions, the plan of collecting babies in institutions should be abandoned, as, on the whole, doing more harm than good. Not only is the mortality under this system very high, but the surviving infants are rarely strong and healthy, in spite of good intentions and care in management. Large wards and large institutions are undesirable as far as the infant is concerned. Atrophic infants with chronic indigestion and malassimilation should never be treated in a hospital. A baby with marasmus will rarely live long in an institution. The best results are obtained by placing babies in individual homes in a district of the country noted for its healthful conditions, with constant attention to diet and hygiene on the part of a physician and nurse who are thoroughly familiar with this class of cases.

Significance of the von Pirquet Test.—Discussing this, T. Frazer (*Med. Rec.*, Jan. 9, 1915) says (1) that a positive cutaneous reaction is less frequent in children than it was once thought to be, the high percentage of reactions obtained being due to the application of the test chiefly to infected children of the poorer classes and (2) that therefore a positive reaction is of greater significance than it is commonly supposed to be. (3) That while there is an increasing percentage of reactions with years, and a corresponding decrease in the value of the reaction, the view usually held that the reaction has significance only during the first two or three years of life is not borne out by recent figures, and that we should be suspicious of a reaction occurring up to the age of ten. (4) That annual tests be instituted in the effort to detect early infection, and that, bearing in mind the fact that many if not most cases of clinical tuberculosis in later years are due to renewed activity of old foci, we should seek by proper means to prevent the development of "infection" into "disease." (5) That a negative reaction, negative or repetition of the test, is valuable evidence of the absence of tuberculosis unless the child be suffering with advanced or acute disease, especially measles.

Surgical Treatment of Infantile Paralysis.—According to C. L. Starr (*Can. Prod. and Rev.*, 1915, xl, 1) one's first efforts should be directed to the preservation and restoration of muscle function. Massage here plays a very important rôle. This massage is preferably done by the parents because it must be continued over very long periods. It should be started as soon as the pain has disappeared and should be given twice daily for periods of thirty minutes to one hour—depending upon the extent of the lesion. It will assist materially in restoration of function of paralyzed muscles if they are held relaxed and not allowed to stretch even to their limit. The deltoid, for example, will recover its power in much shorter time if the arm is held abducted at right angles to the trunk and a special splint is made to hold the arm in this position day and night, excepting during the massage. In paralysis of the lower extremity, the power of the quadriceps will recover most rapidly if the limb is never allowed to flex at the knee, but is held in a completely extended position. In the bulk of cases of poliomyelitis the muscles lose all response to faradism within a few weeks, and hence it seems absolutely impossible to hope that one would get any benefit after that by the use of the faradic current. The galvanic response very often continues, and it seems reasonable to suppose that a moderate amount of utility might be expected from a slowly interrupted galvanic current. A pendulum device might be attached to a galvanic battery so as to interrupt the current at moderate intervals; but in the writer's opinion the time spent in this way might, with greater advantage, be spent in massage. The great atrophy of the soft structures and bones is generally atrophy of disease. For this reason, even if the entire limb is paralyzed, and all hope of regaining muscle power is abandoned, the massage should still be continued during the growing period to assure reasonable blood supply and thus perhaps prevent such shortening. The most constant deformity is fixation and abduction at the thigh resulting from sitting, with flexion which encourages contraction of the anterior ligaments of the hip. A child so afflicted must not be allowed to sit for any length of time. It may be encouraged to lie prone on a hard surface such as the floor. The most crippling of all of the deformities to the lower extremity are those connected with the feet. To prevent equinus deformity one must keep the foot at right angle to the leg. This may be done by the excision of an elliptical piece of skin in front of the ankle-joint of sufficient width, so that when the edges are stitched together they hold the foot fixed at a right angle. The lack of balance due to the inequality of muscle pull can be moderately controlled by splints if started early, and the calcaneus deformity by elevating the heel of the boot. The operative treatment of cases in which deformities have already occurred is also discussed. In most instances, no matter how flail-like the limb may be, it still is sufficient to act as a core for the application of what may be considered an artificial limb, so amputation in such cases is opposed.

Surgery of Cleft Palate.—J. Berry (*Surg., Gyn. and Obst.*, 1915, xx, 85) holds that the operation by median suture (a modification of Langenbeck's) is the only one which restores the palate to its natural condition. Narrow clefts, especially if limited to the soft palate, can be operated on with advantage by this method within the first few months of life. The common single or double complete cleft, associated with harelip, should be treated by closure of the harelip in earliest infancy, the operation on the palate being postponed until the second or sometimes the third year. After suture of the harelip the cleft in the palate undergoes rapid spontaneous narrowing, and the development of the alveoli makes the arch higher. At and soon after birth the cleft is usually very wide and the palatine arch low.

To obtain the best results, according to T. W. Brophy (*Surg., Gyn. and Obst.*, 1915, xx, 98), the operation should be performed in early infancy, preferably before the third month. Cutting or breaking the bones of the hard palate to secure union is an unnecessary procedure. Lateral incisions in the soft palate are unnecessary and should never be made for the following reasons: 1. The ascending palatine or the large branch of the posterior palatine artery is divided, thus causing unnecessary hemorrhage. 2. The blood supply to the palate which we so much need is in a great measure cut off. 3. A new field for infection is established. 4. The nerves are divided, and atrophy may result. 5. If the tensor palati muscle is completely divided it never reunites, and, consequently, an important factor of the palate is destroyed. 6. The tensor palati muscle by traction dilates the pharyngeal artifice of the Eustachian tube. If its function is destroyed defective hearing must ensue. 7. The scar tissue which forms following the incision makes a thick, clumsy palate without that flexibility and resiliency so essential to perfect function. 8. The palate is made shorter instead of longer as it may be made by dividing it from the posterior border of the horizontal plates of the palate bones and using lead plates and wire sutures to relieve tension. Finally, to attain the highest degree of success and to avoid infection, we should use sutures which cannot absorb secretions: horse-hair, silver wire, and lead plates. A cleft palate may be closed, but phonation—correct speech—is the supreme test of the surgeon's work.

Ultimate Results of Harelip and Cleft-palate Operations.—G. V. I. Brown (*Surg., Gyn. and Obst.*, 1915, xx, 87) says that in order to be on the safe side he makes every effort to provide as perfect a palate as possible at a sufficiently early age to make sure that no adverse speech habits have been acquired. Therefore all operative procedures are completed, if possible, before the child is two years old, and preferably at eighteen months or even earlier. Nevertheless some of his best results, as evidenced by freedom from the characteristic cleft-palate speech sounds, have been secured with patients whose ages at the time of the palate operation varied from nine to sixty years, and some of the most imperfect speech results have been with patients that were completed before they were two years old. The natural conclusion from this, especially when one considers another class of cases in which there is defective speech of similar character due to imperfect form in development of hard or soft palate, although without any indication of a cleft, is that perfection or imperfection in form is of paramount importance and often a more active factor in determining the speech results after cleft-palate operation than the speech habit difficulties which have been hitherto considered of first importance.

Auscultatory Phenomena of Larynx in Croup and Pseudocroup.—A. Levinson (*Münch. med. Woch.*, Feb. 2, 1915) says that auscultation of the larynx will aid in differential diagnosis between croup and pseudocroup. The position for the stethoscope is over the upper part of the larynx and the thyroid bone, and at the level of the third ring of the trachea, also at the suprasternal fossa in the middle line. In the larynx it should be placed a little to the left of the median line. The author has had made for the end of the stethoscope a special bulb curved to correspond with the curved surface of the neck. A normal larynx gives at the inspiration a breezy sound, with expiration somewhat longer. In pseudocroup there is an obstructed sound in inspiration while the expiration is prolonged. In the suprasternal fossa there are medium-sized moist rales with inspiration and expiration. In the lungs there is a normal vesicular murmur. In croup the inspiration gives an open vocal sound, deep and rough; expiration is much longer than inspiration. If stenosis is advanced there are no rales, but inspiration is dry.

Growth and Development of Underweight New-born Children.—Hans Opitz (*Monatschr. f. Kinderheil.*, Bd. xiii, Nr. 3, 1914) gives us a study of the growth and development of children who are born under the normal weight. He establishes as a standard of abnormal weight those children who at birth weigh less than 2750 grams. A group of new-born children usually under weight includes twin births. These are excluded from the author's tables. The children are divided into two groups: those in which the illnesses of parents are of importance, and those in which there was abnormal smallness of parents; and second those in whom there was no hereditary factor, who came from healthy, well-developed parents. The children of the first category are born weak; some of them are sick as a result of the parental illness; others, although not sick, have less than normal resistance. Among the hereditary factors are syphilis, tuberculosis, and especially alcoholism; also albuminuria, nephritis and eclampsia of the mother. These children are born small and have lessened resistance. Lorey found that healthy premature children show a mortality after birth of 21.6 per cent. during the first year, while weak premature infants have a mortality of 70 per cent. The children tabulated by the author came from the Klinik at Breslau University, and were from three to five and a half months old at the time of observation. Most of them were illegitimate children of working women. There were 44 with weight of 2750 to 2550 grams, 20 of 2550 to 2350 grams, 9 of 2350 grams or less. The smallest weighed 2170 grams. The mortality of these underweight children is no higher than normal, that is 20.6 per cent. The investigation deals with 97 children weighed by the author and 269 weighed under his supervision by others. The author's conclusions are that weight and diseases of the parent had little effect among these children. Most of them showed a normal weight curve. A third were behind in height and weight. In some there was a combination of hypoplasia and hypotrophy. The development was similar to that of the normal child. Exudative diathesis appeared in a large number of these children. They are more liable to chronic disturbances of digestion, while the disposition to infective diseases was not markedly different from the normal child. Mortality during the first year does not differ from that of normal children.

Treatment of Spasmophilia by Cod-liver Oil and Tricalcium Phosphate.—Ernst Schlossmann (*Monatschr. f. Kinderheil.*, Bd. xiii, Nr. 6, 1914) has treated four cases of spasmophilia with cod-liver oil and tricalcium phosphate, with excellent results. Without any other treatment or changes of hygiene a permanent cure of spasmophile symptoms was obtained, including laryngospasm, Chvostek sign, and increased electrical irritability after a short time. The harmlessness of these drugs recommends them in the treatment of all sorts of nervous diseases of children.

Diphtheria Carriers.—G. Van't Hoff (*Monatschr. f. Kinderheil.*, Bd. xiii, Nr. 3, 1914) tabulates the results obtained from cultures made from forty-one diphtheria patients who had been dismissed as cured from the Berlin Charity Hospital. Instead of cotton swabs he used platinum loops to stroke the tonsils and press the bacilli out of the crypts. The cultures were incubated from twenty-four to forty-eight hours. The author found virulent bacilli present from five to ten months after leaving the hospital with a clinical cure. Bacilli did not disappear in from three to six weeks after cure, as has been supposed would occur; but continued for a much longer period. The cultures were made in the homes of the discharged children who were followed for many months after their discharge from the hospital.

Treatment of Pylorospasm in Infants.—J. Pieser (*Monatschr. f. Kinderheil*, Bd. xiii, Nr. 3, 1914) says that the means suggested by A. T. Hess for the treatment of pylorospasm in infants, namely, the use of a rubber catheter passed through the pylorus for feeding the infant meets with some difficulties. The greatest is that of discovering whether the sound is in the duodenum. Only the x-rays are a sure criterion of its presence. The author has treated two cases after this method, systematically emptying the stomach through the tube, before feeding with it. In both the vomiting ceased as well as the emaciation, and the child recovered.

Observations of Wet-nurses.—Ch. Brodsky (*Arch. f. Kinderheil.*, Bd. lxiii, Heft iii–iv, 1914) has made a careful study of the effects on the mammary gland and its secretions of the application of more than one child to the breasts of a single wet-nurse. This study was made in the Infants' Home at Zurich, on seventeen women. All of them were healthy and were given a Wassermann test before observation. The various observations are carefully tabulated with reference to the milk yield of each woman, and to comparison of the various women. It has long been known that a mother can suckle twins as well as one child. How far this increase of milk can be carried by applying other children to the breasts was to be determined. The secretion of milk is reflexly stimulated by suckling; the more energetically the stimulation works the greater will be the supply of milk. By the use of the breast pump the secretion can be kept up for some months without the child nursing. The duration of lactation appears to be unlimited. Hottentots and Malays have nursed children even after becoming grandmothers. The influence that menstruation has on the supply of milk is also studied by the author. With each nurse the child was applied to the breast five or six times daily, and after each nursing the breast pump was used to empty the breast. The women had ordinary diet to which were added milk, cocoa, tea, and a bottle of beer daily. They did house work, cooking, washing and ironing. The quantity of milk in some cases became doubled after nursing a second child. In a twenty-five-year-old primipara observed the largest quantity of milk given was 5400 grams, after nursing five children. The largest amount obtained by pumping was 3420 gramson the 180th day after delivery, two children being nursed. On the first day of menstruation the amount of milk is smaller, gradually increasing up to the end of menstruation.

1335 Cases of Scarlet Fever Treated with Moser's Serum.—L. Axenow (*Jahrbuch. f. Kinderheil.*, Feb. 8, 1915) gives the conclusions arrived at after the treatment of 1335 cases of scarlet fever with Moser's serum. The cases were treated at the Kinderspital of Petrograd. The serum is monovalent. Of those treated 364 died, that is 27.3 per cent. The serum was given only to severe cases. There were four factors in the mortality among these children: the age of the patients, the day of illness on which the injection was made, the amount of serum used, and the quantity of the applied series. The older the children the lower the mortality. The earlier in the disease the injection was made the better were the effects. The serum should be given in a single large dose to get the best effect. Small repeated doses do not give good results. Doses of 50 c.c. should be given only during the first two days of the sickness; of 100 c.c. in the third and later days of the sickness. A mixture of different series of serum has not a good effect. Not less than 150 c.c. should be given, and all of the serum of the same horse. No child under one year should be injected. The positive good effects of the serum are demonstrated by a lowering of temperature, pulse, and respiration, and an improvement of the general condition. A child who is apathetic and weak may be transformed into a laughing, playful child within twenty-four hours after the injection. The period of eruption is shortened. The serum has no direct effect on the complications of the disease. Nephritis alone is benefited by the serum, and is seldom seen in injected cases. There are undesirable serum effects in some cases. It has a good effect on the complications when streptococci are to be demonstrated in the blood. Bad effects have been lessened as the technic of the use of the serum has been improved with experience. There should be a careful laboratory control of the effects. The cost of the serum must be reduced so that the poor can afford it. In severe cases the serum is most valuable, since it is the only known means of prevention of mortality at present known.

The Third Stage of Rhinitis Luetica Neonatorum.—Else Koch (*Monatschr. f. Kinderheil.*, Bd. xiii, Nr. 6, 1914) says that Hochsinger distinguishes four stages of syphilitic rhinitis in the new-born: first, a diffuse, hyperplastic inflammation of the mucosa, which begins in the anterior nares and extends to the blood-vessels, glands and upper muscular layers; second, a purulent secretion; third, ulceration. The lower layers of the connective-tissue framework are then attacked and in severe cases the cartilages and bones. The fourth stage ends in deformity. The author cites two cases of moderate severity in which the specific condition was much aggravated and rendered fatal by the addition of a benign influenza, which was easily recovered from by other normal children. In both these cases bacterial examination showed the presence of streptococci in all parts of the diseased tissues and in the blood. The occurrence of the influenzal infection produced an acute form of the syphilitic infection, rapidly fatal. It is generally slowly fatal from sepsis. The added active infection hastens the transformation into the third stage of the specific rhinitis. Added to the sepsis may be a purulent meningitis. In such cases we should take the greatest care not to allow the syphilitic child to come in contact with the influenza bacillus.

Laboratory Diagnosis in Early Stages of Congenital Syphilis.—C. G. Grulee (*Amer. Jour. Med. Sci.*, 1914, cxlviii, 688) states that there is no test which is proved to be pathognomonic of congenital syphilis in the early stages, between birth and the development of active symptoms. The examination of the urine and the routine examination of cerebrospinal fluid for globulin content and cells offers little evidence of value for the diagnosis of this stage of the disease. The evidence as to the Wassermann reaction all goes to show the unreliability of the test at this age. The Lange gold chloride reaction on the cerebrospinal fluid offers at present some hope that the evidence obtained in this way may be of distinct benefit. Judging from present reports as to the luetin test, active treatment with mercury materially influences it, so much so that without the mercurial treatments no cases have as yet proved positive. The Noguchi test has, however, a distinctly negative value, as in all cases not syphilitic the reaction was negative.

Duodenal Ulcers in Infancy.—Five cases of duodenal ulcer in infants from one to five months old, seen within two years, are reported by B. S. Veeder (*Amer. Jour. Med. Sci.*, 1914, cxlviii, 709) the diagnosis being confirmed at autopsy in three of these and made at that time in one. One case recovered. All the infants were under six months of age and marasmic. Three had had a fair start on breast milk, so that the degree of chronic nutritional disorder was out of proportion to the dietetic error. Vomiting was present in all five cases, marked in three, occasional in two, but reverse in one of these. In one case it resembled the type occurring in pyloric obstruction. Peristaltic waves and tumor were absent. Massive hemorrhage was present in four cases. Severe collapse as a result of the hemorrhage occurred in two cases, being a minor factor in one but almost immediately fatal in the other. When there is no gross hemorrhage the diagnosis of duodenal ulcer cannot be made in an infant, since subjective symptoms are absent. The diagnostic significance of occult blood is questionable. The prognosis is unfavorable, largely on account of the age of the infants in whom the ulcers are most frequently found and the association of chronic nutritional disorders. The only definite indication for treatment is to place the infant under the best nutritional conditions, that is upon breast milk. If methods are found by which an ulcer can be recognized early, surgical treatment offers a theoretical possibility. It is unknown whether the relationship of the nutritional disorder to the duodenal ulcer is one of cause or result.

Four Years of Clinical and Bacteriologic Experience with Meningitis in New York City.—P. L. Du Bois and J. B. Neal (*Amer. Jour. Dis. Child.*, 1915, ix, 1) of the preventive medicine annex of the Research Laboratory of the New York Board of Health find that the conditions most often confused with epidemic or meningococcic meningitis are other purulent meningitides due most commonly to the streptococcus and pneumococcus and less commonly to the *Streptococcus mucosus capsulatus* and influenza, tuberculous meningitis, poliomyelitis and meningism, particularly in pneumonia. The points of differentiation in their order of value among the above-named conditions are in general, lumbar puncture with the examination of the fluid, the history and the physical signs. A clear fluid increased in amount indicates usually one of the following conditions: tuberculous meningitis, poliomyelitis, syphilitic involvement of the central nervous system, brain tumor or meningismus. A cloudy fluid is the result of a meningitis due to the meningococcus or some of the other pyogenic organisms. A cell count is of no great advantage as there is nothing particularly diagnostic in the exact number of cells per cubic millimeter. The stained sediment shows whether the cells are increased much, little or not at all. Fluids showing globulin are said to be the result of inflammation of the meninges. It is the most important of the chemical tests, because it separates fluids due to meningism from those due to a true meningeal infection. The statement is now and then made that a differential point in diagnosis between tuberculous meningitis and poliomyelitis is the fact that poliomyelitis fluids will reduce Fehling's solution, but tuberculous fluids will not. The writers have tried Fehling's reaction with eighty-eight known tuberculous fluids and sixty-five, or 73 per cent., gave good reduction. The absence of reduction is of marked significance; the presence of reduction means absolutely nothing. Meningism is that condition in which meningeal symptoms arise in the course of some disease, the cerebrospinal fluid being increased in amount but normal in character. The authors have never seen a case of generalized meningitis following a case of meningism, which one would expect to see occasionally were there a localized infection of the meninges. In view of the relatively large number of patients that recover promptly, they believe that in most cases the condition is a functional one, probably of toxic origin. Latterly, they have done a lumbar puncture even though they have felt sure it was meningism, as the withdrawal of the fluid seems to hasten recovery. In examining patients, the authors particularly note stiffness of the neck, variation of regularity in rate and depth of respiration and Mac Ewen's and Brudzinski's signs. The mental condition is frequently good in epidemic cerebrospinal meningitis unless the case is of the fulminating type. Early in tuberculous meningitis there is irritability, later stupor. In poliomyelitis irritability not followed by stupor is the usual thing. Conjunctivitis is fairly common in epidemic cerebrospinal meningitis and rare in other meningeal conditions. Ptosis and strabismus are more common in tuberculous meningitis, but may occur in other meningeal conditions. Kernig's sign is difficult to make sure of in young children. Brudzinski's sign is of much greater value. In true meningitis the depth and time between respirations is markedly irregular. Late, particularly in tuberculous meningitis, the respiration frequently becomes Cheyne-Stokes. The pulse is more apt to be irregular in rate and volume in tuberculous meningitis than in other meningeal conditions. Palsies are uncommon in epidemic cerebrospinal meningitis; in 112 cases palsy was seen twice only. It is common, but usually transitory in tuberculous meningitis, and always present in frank cases of poliomyelitis. The temperature in general is low and long continued in tuberculous meningitis, is high, rising rapidly and dropping quickly in poliomyelitis and runs a very irregular course in epidemic cerebrospinal meningitis. Eruptions aside from herpes are not very common in the writers' experience, though epidemic cerebrospinal meningitis has been known as spotted fever. In 112 cases they have seen an eruption sixteen times. Among 529 cases they have seen more than one case in a family in only four instances. They think the most satisfactory method of dealing with carriers is to swab out the nose and throat two or three times daily with 20 per cent. argyrol. The technic of intraspinal administration of antimeningitis serum is discussed. They do not regard the presence of trikresol in the serum as the cause of such accidents as have occurred. In cases which showed a tendency to become chronic an autogenous vaccine, given every four or five days in doses of from 250 to 1000 million, has sometimes seemed to be very effective. The use of hexamethylenamin is recommended in all acute meningeal infections. The patient is best kept in a quiet darkened room. Sedatives are needed if very restless. The bowels and bladder should receive careful attention, particularly the latter. Patients should not lie in a draught and should be carefully covered up, especially during and after puncture. They easily fall victims to pneumonia. It must be remembered that the meningococci are found in the secretions of the nose and throat and in the urine. The diet should be easily digestible but generous in amount. The high caloric diet of typhoid is indicated, for meningitis, like typhoid, may be prolonged. The ice-bag gives a measure of relief for the headache. In basic meningitis brain puncture may do some good but it is not of much avail.

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ORIGINAL COMMUNICATIONS

CLINICAL OBSERVATIONS ON THE TREATMENT OF ACUTE PELVIC INFLAMMATIONS.*

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(With two illustrations.)

It is interesting to trace the swing of the pendulum in the history of the treatment of pelvic inflammatory exudates from the days of Sims—when the rule was to wait anxiously for the formation of a well-defined area of fluctuation at the vaginal vault or the inguinal fold, and then timidly incise and allow the abscess to drain—to the extreme radicalism of Péan and Segond who extirpated the uterus by vagina so that they might the more easily reach the abscess and thus provide for ample drainage.

Prior to the advocacy of this latter method, Lawson Tait fearlessly attacked the problem by operating through the abdomen, and when he could not get the suppurating sac out entire, he sutured the abscess wall to the abdominal incision and drained it extraperitoneally.

Laroyenne, Vulliet, and Bouilly in France opposed these severe measures and were able to show results that were better, by the early resort to the simple vaginal incision and drainage. Kelly, Cabot, and Noble were advocates of the same method in this country. Henrotin, in 1895, advised attacking all pelvic exudates in their incipiency by vaginal incision and exploration, without waiting for positive evidences of pus formation. Polk in 1902 advanced the idea of opening the vaginal vault to incise and drain acute gonor-

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rheal tubes at the onset of their infection, as a means of saving them from destruction—just as the otologist incises the tympanum to conserve the middle ear.

Now the pendulum swings back again to the position of watchful waiting and masterly inactivity, as in the days of Sims—in accordance with the writings of Merman, Watkins, Zangemeister, Goodall, and others.

Etiology.—Pelvic suppurations are the result of bacterial infection which has been conveyed from without the body by way of contiguous mucous surfaces, or by the lymphatics, and the blood-vessels—except, possibly, in abscesses of tuberculous origin. They may be classified as (1) cases originating during labor or miscarriage; (2) cases from gonorrhea as the result of extension of the infection; (3) cases due to infection with unclean instruments, as may occur during operations or treatments.

The latest studies of Krönig, Bumm, Wegelius, Winter, and others demonstrate that in healthy women during the last weeks of pregnancy the vagina contains streptococci and staphylococci in from 40 to 75 per cent. of all cases. Probably in the majority of all puerperal cases two or more varieties of bacteria are factors in the etiology of the infection. The streptococcus is the most frequent cause, and certain strains of this organism have great invasive power. The staphylococci, while less invasive, are pus producers, owing to their possession of leukocidin and a proteolytic ferment which kill the abundant leukocytes present—due to the marked leukocytosis, and liquefy the tissues producing pus. As might be expected from the proximity of the rectum, the colon bacillus is a common factor, and as Krönig showed in 1894, a pre-existing gonorrhea may be responsible for many cases of puerperal infection.

Traumatic lesions of the perineum, vagina, cervix, or endometrium are the avenues of entrance for the bacteria which are conveyed by the blood stream and lymphatics, to the parametrium or perimetrium, and by extension along the mucous membranes infect the tubes, the ovaries and the peritoneum.

Varieties.—Suppurative parametritis and perimetritis, pyosalpinx, tuboovarian abscess, and isolated purulent collections in the pelvic cavity are commonly included under the term "pelvic abscess." Too frequently, no attempt is made to differentiate them in making a diagnosis. The course of each type differs in its history, and a proper treatment and prognosis is dependent upon an intelligent understanding of the particular variety under consideration. It may be advantageous to briefly recall their different characteristics.

Parametritis.—Parametritis or pelvic cellulitis was first noted as inflammation of the pelvic connective tissue, by Mauriceau, in 1760. Virchow first used the term "parametritis" to denote these phlegmonous inflammations of the pelvis. For a long time all suppurative processes located in the pelvis were denoted as "pelvic cellulitis," but the researches of Matthews Duncan, Freund, von Rosthorn, and others, have properly differentiated it from the other varieties of pelvic inflammations.

The softened edematous state of the tissues coincident with pregnancy and the increased vascularity, coupled with the trauma of labor or abortion, render the soil peculiarly favorable for the rapid development of bacterial growth. The streptococcus is the most frequent cause, and the staphylococcus and colon bacillus are often concomitant factors, and Menge and Doederlein are authorities for the statement that the gonococcus may produce parametritis.

The pathology of pelvic cellulitis does not differ from cellulitis in other parts of the body. The bacteria travel in the direction of least resistance, which is along the natural planes of cleavage of the connective tissues, limited by layers of fascia and the pelvic organs.

Von Rosthorn classifies pelvic exudates as follows:

1. Lateral horizontal exudates, located in the bases of the broad ligaments, with a tendency to spread to the side walls of the pelvis and around the cervix. These usually originate from pelvic tears.

2. High intraligamentous infiltrations beginning near the cornua uteri, forming tumors rounded above with a tendency to infold the broad ligaments and climb up into the iliac fossæ. These usually come from an endometritis.

3. Exudates in the retrocervical connective tissue, with a tendency to spread either posteriorly along the uterosacral ligaments or sink into the rectovaginal septum.

4. Exudates in the precervical tissues, spreading toward the sides around the uterus.

5. Exudates anterior to the bladder behind the pubis, with the tendency to rise behind the recti muscles, even to the navel—the "plastron abdominal" of the French. Several of these varieties may be combined, but the most common is the lateral, extending from the side of the uterus to the bony pelvic wall, then anteriorly around the ureter, raising up the peritoneum and appearing above Poupart's ligament. The pelvic peritoneum is always involved in the process, and the adnexæ or intestines may be adherent to the pelvic mass. Consequently, it is frequently difficult to determine whether a parametritis or a perimetritis is the predominant lesion.

Parametritic exudates not infrequently become absorbed, especially if early operative interference is avoided. If suppuration develops, the pus is discharged externally, or it may become encapsulated and complete absorption occurs. Cicatricial thickening is the final result of the process, and it may fix or distort the uterus. When pus has developed, it will point according to its location, and if not evacuated surgically it will rupture externally or into the adjacent viscera in from twenty to seventy days. It is well to remember that in cases where the pus has become encapsulated and the acute evidences of the disease have subsided that the bacteria do not always lose their virulence. Traumatism, lowered resistance, etc., may cause the acute symptoms to break out anew as a virulent bacteremia. Parametritis usually begins its onset on the third or fourth day after the infection. Olshausen says there is little danger after the fifth day, but DeLee states that he has seen parametritis begin on the eighth or ninth day. This is observed in cases of so-called "late fever," which has been precipitated by the patients getting up and going about while having a mild parametritis which has been overlooked. The disease is ushered in by a chill or rigors, a temperature of 103° or 104° F., with a pulse of 100 to 110. There is well-marked localized pain. The patient gives the impression, however, of not being seriously ill. The fever is of the continuous type until suppuration ensues, when it becomes remittent or intermittent, accompanied by chills and sweats. In cases which resolve, the symptoms gradually subside and the exudate disappears in from ten to sixty days.

At the onset, pelvic examination shows the uterus to be subinvoluted and softened, and there is great tenderness at the site of the exudate. Later, the vaginal vault feels infiltrated (wooden), and the uterus seems fixed as if in plaster of Paris. Fluctuation may not be recognizable, even when the abscess is well developed. Abdominal palpation, while eliciting pain on deep pressure in the inguinal regions, shows relatively slight rigidity, as compared to early peritonitis. Frequently the mass may be palpated above Poupart's ligament.

II. Perimetritis.—Perimetritis, or pelvic peritonitis, results most frequently from an extension of a gonorrheal or other septic infection from the endometrium through the tubes to the peritoneum, covering the adnexæ, uterus, intestines, and the pelvic wall, and enveloping these organs with a plastic exudate that later develops into adhesions. The infection may travel through the lymphatics of the broad ligaments and may extend from a parametritis, as has been mentioned.

The rupture of an appendiceal abscess into the pelvis, the direct inoculation by puncture with instruments, or tuberculosis originating elsewhere in the body, may be a cause. If the streptococcus is the etiological factor, there is frequently a rapid extension to the general peritoneum, with a fatal result. Many of the infections are of a milder type, especially the gonorrheal, which tends to the localization of the pus, which is walled in the pelvic cavity by the intestines and omentum.

Abscess formation is more common in perimetritis than in parametritis. Its situation may be high, near the fundus of the uterus and lateral to it—as in a tuboovarian abscess and in peritubal abscess—the intestines and omentum forming part of the wall in the latter type; or it may be situated low, occupying the culdesac, in which case the roof of the abscess may be formed by intestine. Resolution and absorption may occur, but the process takes longer than in parametritis and it leaves more troublesome after-results. Sterility is usual, owing to the permanent damage which has been done to the tubes.

As soon as the peritoneum is involved, localized pain becomes a prominent symptom. Rigidity of the abdominal muscles is developed, the knees are drawn up, the pulse is rapid, the temperature may be high, and there is the anxious facial expression that proclaims the patient to be seriously ill.

It is wise to remember that there is considerable danger of rupture, and dissemination of the pus during the palpation of a suppurating pelvic exudate. DeLee has seen two cases of death from the rupture of a pelvic abscess during examination.

Differential Diagnosis.—It is not always possible to differentiate between a parametritis and perimetritis, as they frequently coexist, but if a careful study is made, a satisfactory classification of the lesion can be determined in the majority of instances. The effort should first be made to determine the etiology. The history should show whether the case is of a puerperal or nonpuerperal type. If nonpuerperal, a differentiation between a gonorrheal origin or an infection due to instrumentation should be made. Microscopical examination of smears from the cervical canal and the history will aid us here. If it is due to gonorrhea, the probability of a perimetritis as a result of tubal disease is paramount. The disease is very liable to be bilateral, and we would expect the location of the mass or masses to be high, in the region of the tubes or posterior to the fundus. If the abscess is large, however, it may occupy the entire pelvic cavity posterior to the uterus.

In cases of puerperal origin, either parametritis or perimetritis may be the condition present. The history of an induced abortion, or curettage following labor or abortion, or an operative delivery, points to the etiology.

In pelvic cellulitis, the exudate is generally low and unilateral, and is characterized by hard infiltration which does not show signs of softening until late in the disease, while perimetritic exudates are soft from the onset. Bandler states that "all lateral tumors which have a sharp, round lower border speak against a parametritis. In the acuter stages, a lateral parametritic exudate has an upper border of a rounded character, whereas a perimetritic condition has a diffuse upper border through adhesions of the intestines, while its lower border is sharp because it is outlined by the peritoneum of the culdesac of Douglas." It is important not to neglect rectal palpation in studying a pelvic exudate. While at the onset of the disease it may be difficult to differentiate the type, later the presence or absence of the signs of peritonitis and the location of the exudate may make the diagnosis clear.

Prognosis.—If the infection is not due to the streptococcus and the exudate is walled in, the prognosis as to life is good. The prognosis as to health is not so good, as the frequently resulting displacements and adhesions of the appendages may produce a chronic invalidism that cannot be relieved without subsequent operation.

Treatment.—A symposium on the treatment of suppurative pelvic lesions was held in the International Congress of Obstetrics and Gynecology in 1896, when a number of men advocated simple vaginal incision and drainage in preference to the abdominal route or a radical vaginal hysterectomy—notably Bouilly, Landau, Laroyenne, and Kelly. In spite of this, the operation of colpotomy for these conditions did not find much favor, and in 1899 Schauta, in particular, was an ardent advocate of the total radical operation for acute suppurative disease, and apparently he is so still. He then reported 216 cases operated on after this manner, with thirteen deaths. In 1912, Thaler, reporting the results in Schauta's clinic, states that of 597 women who had been operated upon by this radical method, 343 were under thirty years of age. This seems a large proportion of young women to be subjected to a total extirpation of their sexual organs and consequently to be forever debarred from even the hope of maternity, when we consider the experience of other observers with the operation of simple colpotomy and drainage in these acute cases. While it is true a certain proportion may have to have a secondary abdominal operation to relieve them of adherent adnexæ, a surprisingly large number are cured of their symptoms, and a not inconsiderable number bear children. Krönig, in a study of the results of the different methods of operation in acute adnexal diseases, criticises Schauta's statistics and conclusions. He quotes Schauta's figures in cases of suppurative gonorrheal adnexæ from 1894 to 1909, as follows:

114 Conservative operations:
  73.9 per cent. good result.
  13.0 per cent. improved result.
  13.0 per cent. bad result.
119 Radical operations (total extirpation):
  93.5 per cent. good result.
  2.6 per cent. improved result.
  3.9 per cent. bad result.

Krönig says it is hard to see what Thaler, Mandl, and Bürger (Schauta's assistants) understand by cure when they say the patients have no complaints, as they cannot naturally be entirely free from symptoms after a radical operation, since in the majority of cases the operation was done in young women under thirty years of age. He states that the simple vaginal incision and drainage (or abdominal incision if pus is pointing in that location) is the method of choice for septic and putrid pyosalpinx. There is no sharp boundary line between a gonorrheal or septic pyosalpinx, or an abscess in the culdesac. The simple incision usually gives a good result, but a fistula may occur in gonorrheal pyosalpinx. Schauta says it is impossible with the simple colpotomy incision to reach all the pockets in a case of pyosalpinx, and that in his clinic 25 per cent. of the cases so treated required a secondary operation.

In 1902, at the international Congress, Bogodanovics of Bucharest, made a plea for the conservative operation of colpotomy in these cases. He complained that the method had "fallen into the shadow" and that the place of honor was occupied by "les grands interventions," the more brilliant operation of total extirpation of the uterus and adnexæ, by either the abdominal or vaginal route. He reported thirty-five cases of simple colpotomy incision for various acute suppurative conditions, and in only one case was a secondary extirpation necessary. Merman has treated 330 cases of all grades of puerperal fever expectantly, and lost only seven women.

Krimsky, of St. Petersburg, follows the radical abdominal method in these suppurative inflammations, and his mortality rate seems high, 35 per cent., according to a recent article. He compares his percentages with Thaler's statistics, and considers his own to be more favorable, as his cases averaged a shorter stay in the hospital—thirteen to eighteen days. He claims as an advantage for the radical method that it is impossible for trouble to arise later in diseased tissues.

Schottmüller and Barfurth recently reported a series of 96 cases operated upon by vaginal puncture. Forty-four of these cases were subsequently examined, and 19 were found to be free of all symptoms; and 2 had become pregnant. In 89 cases, 55 were due to infection occurring postabortion, postpartum, or after extrauterine pregnancy.

Von Lingen also reports 74 cases. Thirty-six were treated by posterior colpotomy and rubber tube drainage left *in situ* for at least three to four weeks, and, of these, 3 died.

In this country, Noble, in 1902, made a statistical study of the results of the treatment of pelvic suppurations in 200 cases. He found a mortality of 27 per cent. for the total abdominal operation, as compared to 1.8 per cent. for treatment by simple vaginal incision and drainage. In 54 cases operated upon by this latter method there was but one death; 32 were cured; in 6 the ultimate result was unknown. The one death was from heart clot immediately after operation. There were 15 partial failures, where subsequent operations on one or both appendages were necessary, but in only three of these was it necessary to remove both adnexæ. Six pregnancies have occurred since the operation. He found that puerperal phlegmon and puerperal ovarian abscess offer the best field for incision and drainage, and a cure with the preservation of the organs of generation may be expected in such instances. In many cases of puerperal suppurating salpingitis the same is also true.

Brothers, in 1903, found, in 91 cases studied at the operating-table, that 33 were of gonorrheal origin, 4 were of gonorrheal origin associated with abortion; 25 were of puerperal and 25 of traumatic origin; 3 were appendicular, and one was tubercular. He found that twice as many were located in the tuboovarian tract as in the pelvic connective tissue.

Polak, in 1910, reported an important study of 200 cases of puerperal sepsis. Of these, 72 had peritonitic or parametritic exudates. He noted that those cases that had not been subjected to intrauterine manipulations before entering the hospital seldom developed exudates. Of the 72 cases, 63 had been curetted one or more times prior to admission. Only 7 of the exudates terminated in suppuration, which is a strong argument for expectant treatment. The earliest abscess occurred on the nineteenth day, and the latest on the eighty-second day. Suppuration was evidenced in each instance by a relative increase in the polynuclear percentage and a drop in the leukocyte count. No mass suppurated when the count showed more than 20,000 leukocytes and a polynuclear count below 82 per cent.; 4 cases were opened and drained by vaginal section, and 3 by extraperitoneal incision above Poupart's ligament; 65 of the exudates were completely absorbed. The convalescence varied from four to eight weeks.

Cummings has recently made an analytical study of 200 cases of acute and chronic pelvic inflammatory disease occurring in the gynecological clinic of the University of Michigan. Thirty-eight per cent. of the cases were due to gonorrhea; 18 per cent. were caused by sepsis following abortion and 25 per cent. followed confinement; 10 per cent. were tuberculous, and 8 per cent. were unclassified. It is strange to note that in this series only 1 case was classed as a pelvic cellulitis.

While it is evident that some of the authorities abroad employ the total radical vaginal or abdominal operation of extirpation for pelvic suppurations, in this country the majority of operators adopt the more rational procedure of simple incision and drainage, with the object of conserving the function of the organs. The weight of evidence at hand seems amply to justify this conservatism beyond dispute. We cannot do better in puerperal cases than to follow the dictum of Polak: "never disturb a local focus postpartum as long as the patient shows improvement, unless there is a definite evidence of localized pus." Large puerperal masses disappear wonderfully in a few weeks, if let alone. Masses due to gonorrheal infection, however, do not disappear in the same way, but become chronic and produce disability.

In the onset of acute gonorrheal salpingitis, the same let-alone policy is to be followed during the acute stages, until positive evidence presents of the formation of a pelvic abscess with symptoms of absorption sufficient to demand evacuation.

In the treatment of pelvic cellulitis, we desire to hasten the absorption of the exudate and to prevent the spread of the infection, and, if suppuration occurs, to limit the extension of the abscess. Rest in bed is imperative to prevent the spread of the infection and to favor absorption of the exudate.

Frequent pelvic examinations are harmful and intrauterine manipulations are dangerous. The use of the curet is undoubtedly one of the most potent causes of the formation of an exudate. An ice bag may be applied to the lower abdomen at the onset, but it is doubtful whether it is of any real benefit. That there is considerable danger in its too prolonged application, is undoubted. I have recently seen a case in consultation where the skin of the entire abdominal wall, from the symphysis to the umbilicus, had completely sloughed away, as the result of frost-bite from the continuous application of an ice bag. Supporting measures and fresh air are the basis of the treatment during this stage. Later, when the acute symptoms subside, an attempt to hasten the absorption of the exudate should be made by the use of the dry hot-air bath, as recommended by Bier, Polano, and Gellhorn. Prolonged hot vaginal douches are also an aid. I believe that massage of the pelvic mass, after several months, as recommended by some to hasten absorption, is of doubtful value, and may be dangerous.

In cases of perimetritis, the same line of treatment should be followed, with the addition of the employment of the Fowler position. Owing to the possibility of the extension of the infection to the general peritoneum, the condition of the abdomen should be closely watched for the development of rigidity, tympany, and pain. The pulse is a valuable indication as to the involvement of the peritoneum. The Murphy drip should be employed early on the appearance of the signs of peritonitis. The Fowler position can be maintained most comfortably for the patient and most satisfactorily for the surgeon by the use of the Gatch frame, which converts the mattress into an adjustable steamer chair.

The occurrence of repeated chills and remittent or intermittent fever accompanied by sweats, and a rapid pulse, with the presence of a fluctuating mass in the pelvis, makes with certainty the diagnosis of a pelvic abscess requiring evacuation. If there is any doubt as to the presence of pus in an exudate, the aspirating needle should be used without hesitation.

The diagnosis having been made, the position of the exudate in relation to the adjacent organs should be carefully studied under anesthesia, due regard being paid to the danger of rupturing the abscess wall during the manipulations. This is especially important in abscesses of the perimetritic type, as the adhesions are frequently quite frail and thin.

The route of attack must depend upon the location, but with the exception of those cases in which the abscess is situated high up laterally and can be plainly palpated in the region of Poupart's ligament, the advantages of the vaginal route are so obvious that it is scarcely open to argument. Entrance into the abdominal cavity by this avenue is easy and gives the best drainage possible, besides being safe, and with the minimum amount of shock and discomfort to the patient.

Technic.—The patient should be prepared locally as for any vaginal operation. Tincture of iodine—half-strength (2½ per cent.)—should be applied to the entire vagina and the vulva. Since we have employed iodine for the sterilization of the parts in this location, I believe we have been able to secure a more sterile condition for this difficult field than by any other method.

The preliminary curettage with which it has been the custom of many operators to precede the vaginal incision, I believe is to be condemned absolutely as unnecessary and dangerous.

The posterior vaginal wall having been well retracted, the posterior lip of the cervix is securely seized with a Jacobs' forceps, and strongly drawn upward so as to expose the fornix. A transverse cut is made with scissors through the posterior vaginal wall in the middle line, about half an inch from its attachment to the cervix. This is extended laterally well out toward the sides of the vagina, and should be wide enough to allow the easy passage of two fingers. After the vaginal wall has been cut through, the peritoneum of the culdesac will be encountered and will be found to readily push away from the examining finger or instrument, so it should be grasped with forceps and held while it is opened with the scissors. The opening is then widely stretched with the fingers, or a branched dilator may be used. Boldt has devised a special instrument for this purpose, which insures a wide entrance into the pelvis. The beginner is apt to err on the side of too small an opening—perhaps through timidity—but if the opening in the middle line is enlarged by stretching and not by cutting, there is no danger of injuring important structures. The fingers are then passed into the pelvis, and the abscess is gently palpated and its relations studied bimanually. The finger then breaks into the abscess cavity and the pus is evacuated. A specimen should be caught in a sterile test-tube for laboratory examination. Great care should be exercised after opening the sac not to disturb its walls nor the adhesions shutting it off from the abdominal cavity above. Remember that the roof or sides are frequently formed by the bowel, and care should be used in exploring for supplementary pockets.

In cases in which the abscess extends to the vault of the vagina, it frequently is not possible to open the peritoneum of the culdesac separately, owing to its infiltration obliterating the line of cleavage. The incision then goes straight through to the abscess cavity. In abscesses situated laterally and between the folds of the broad ligaments, it is frequently not necessary to open the peritoneum at all, but is best to adopt the procedure of Hunner, which is to push the peritoneum of the culdesac away without opening it, and to pass the finger laterally under the peritoneum and attack the abscess extraperitoneally.

The method of drainage differs with different operators. Some prefer gauze and some, rubber tubing. Personally, I use both methods, the selection depending upon the conditions present. I cannot agree with Mallett, who states that rubber tube drainage increases the suppurative process.

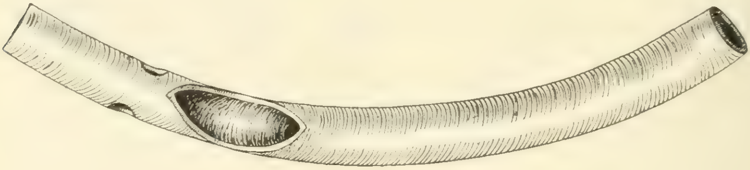

FIG. 1.—Rubber tubing with fenestra before bending.

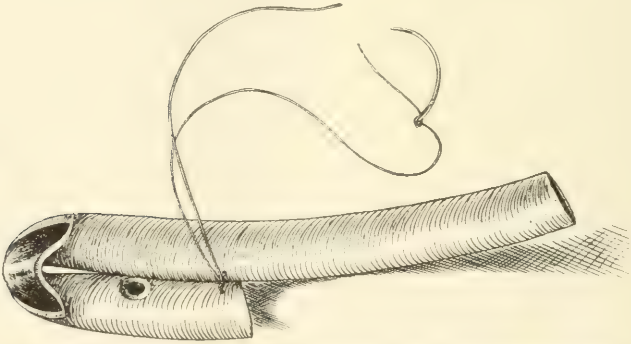

FIG. 2.—Tubing ready to be introduced into colpotomy incision.

In cases with well-defined abscess cavities which contain a quantity of pus, a free and long-maintained opening is required, which shall be subjected to as little obstruction to the exit of the discharge as possible. I believe that a proper drainage tube will here fulfill these requirements more thoroughly and more easily than will gauze drainage. The drainage tube I have devised for this purpose, and which I have used with much satisfaction, is made as follows. A piece of tubing of the diameter of the index-finger and about 6 or 7 inches in length, is cut with a large fenestra about 2½ inches from one end. Additional small openings may be added to the short end only. The tube is then bent at the center of this opening, and the arms of the tube are sutured together near the end of the short arm with a single silkworm-gut suture, which is left long with a cervix needle attached. The doubled tube has now one short and one long arm. The tube is inserted into the cavity to be drained through the colpotomy incision, and the attached suture is passed through the posterior lip of the cervix and tied. This secures the tube in position as long as desired. The long arm of the tube extends down to the vulva, where it may be readily exposed for the easy insertion of the nozzle of a syringe or an irrigating apparatus for the purpose of keeping the tube from being blocked with clots or débris, the return flow cleaning the short arm.

I believe it is unwise to irrigate the abscess cavity, either at the time of operation or subsequently. If the avenue of drainage is ample, it is unnecessary, and there is a danger of disseminating the infection. An injection of a salt solution with just sufficient pressure and quantity to clear the tube is used each day, as indicated. A vaginal douche, under low pressure, of a weak solution of potassium permanganate will keep the tube and the vagina clean. The tube should be left *in situ* until all drainage has ceased.

The patient should be kept in the Fowler position throughout the convalescence.

It occasionally happens on entering the pelvis, that one finds there is much less purulent matter present than was expected, and that instead of a well-defined abscess cavity the mass is made up of extensive adhesions, binding the adnexæ and the intestine together, the pus being held in the interstices. In such cases, I prefer to use iodoform gauze drainage. The gauze can be packed higher into the pelvis and into the irregular spaces, and will tend to maintain a drainage way through the tortuous channel more perfectly and more safely than the tubing. Sufficient gauze should be used to gently distend the cavity. Care should be taken to envelop with rubber tissue that portion of the gauze which is in contact with the colpotomy incision, as needless pain will thus be avoided on starting the removal of the drain. A few inches should be withdrawn and cut off each day. After its complete removal, the patency of the incision should be maintained with fresh gauze until the discharge has ceased.

I believe the median incision should be used whenever possible, to attack laterally situated parametric exudates, as the drainage can be more readily maintained in this location. In those cases where the location of the phlegmon is near Poupart's ligament, beyond easy access from the vagina, the extraperitoneal attack should be made above the ligament. If the pus cavity is extensive, a combined vaginal and abdominal drainage is of decided advantage.

I have recently made a study of 39 of my cases of pelvic abscess showing indications for operation, in which the above principles guided the treatment. All these cases have either been seen personally or have been written to, with the object of ascertaining their present status, the necessity for subsequent operations, the occurrence of pregnancy, etc.

Of the 39 cases, there were 4 deaths. Of the 35 remaining patients, 24 who have been examined or heard from are reported as cured; 2 cases were failures (that is, they required a subsequent radical abdominal operation, owing to the failure of the simple incision and drainage to effect a cure); 1 case is still convalescing in the hospital; 8 were discharged as cured, but have not been heard from. The ages ranged from nineteen to forty-eight years.

Thirty-eight of the cases were treated by posterior colpotomy and drainage, and 1 case was operated upon by an extraperitoneal incision above Poupart's ligament, with thorough drainage to the vagina. Tube drainage was employed in 30 cases, and gauze drainage in 9 cases.

The diagnosis, as recorded at the operation, was:

Pyosalpinx	1
Ovarian abscess	3
Tuboovarian abscess	2
Suppurating ovarian cyst	1
Pelvic cellulitis	6
Pelvic peritonitis	5
Pelvic abscess (type not ascertained)	21
	39

The etiology was classified as:

Postabortion	8
Postpartum	6
Appendix	2
Gonorrhea	5
Postoperative	7
Undetermined	11
	39

The location of the exudate was:

Unilateral (right)	12
Unilateral (left)	14
Bilateral	6
Not stated	7
	39

The contents of the abscess was stated as:

Pus	31
Purosanguineous fluid	6
Not stated	2
	39

The number of days of drainage in 32 cases (7 not ascertained) was:

Shortest	3 days
Longest	22 days
Average	9 to 12 days.

The number of days after operation before the temperature remained below 100°F. was:

Longest	20 days
Shortest	2 days
Average	3 to 4 days.

The number of days in bed in 32 cases was

Shortest	3 days
Longest	31 days
Average	7 to 14 days.

The number of days in hospital in 32 cases was

Shortest	11 days
Longest	56 days
Average	11 to 23 days.

Twenty-one cases were between 11 and 23 days. Of the 3 cases with the longest stay—52, 55, and 56 days—1 required a secondary abdominal operation, and 2 required a second colpotomy.

Of the 2 cases classed as failures, 1 had a pelvic abscess originating from the right adnexa, which formed a smooth rounded sac, about the size of an orange, nearly filling the pelvis. It was opened, and about half a pint of pus was evacuated and tube drainage employed. One month later, it was necessary to do a radical abdominal operation to affect a cure.

The second failure was an appendiceal abscess which pointed into the pelvis. It was opened and drained, but a secondary abdominal operation was necessary, two weeks later.

Of the 7 cases which developed pus, requiring colpotomy and drainage secondary to an operation, 3 followed extensive abdominal operations for dense adhesions and old purulent adnexæ; 2 were due to infection of a blood clot, the result of extensive oozing after operation; 1 followed a trachelorrhaphy performed by a physician in the home under nonaseptic conditions; and 1 was infected as a result of puncture of the uterus during a curettage.

Three cases required a secondary colpotomy owing to the incision being allowed to close too soon.

There has been no mortality among the last 24 cases, the 4 deaths occurring among the first 15. All 4 of these cases were profoundly septic when brought to the hospital, as a result of prolonged infection, and the patients died of a general septicemia shortly after the operation. One case developed multiple abscesses of the lungs, as proved by an autopsy.

Pregnancy is known to have occurred in 3 cases since operation.

Of the 39 cases reported all gave evidence of an accumulation of pus that was causing marked systemic disturbance and which it was imperative to evacuate in order to relieve the patient. The ultimate results which have been ascertained in this series show conclusively that in the large majority of instances a radical extirpation of the pelvic organs was not necessary to secure for the patient a cure, so far as freedom from symptoms was concerned. As these patients were in the great majority of instances young women, there could seem no justification for depriving them of their organs and the chance of child-bearing, and submitting them to a far graver procedure because of the possibility that a small proportion might require a secondary radical operation. Should a subsequent operation be necessary for the relief of resulting adhesions, it could be done under safer conditions, and either one or both adnexæ might still be saved in many cases. The importance of conserving the child-bearing function and the avoidance of a premature menopause is self-evident.

I am aware, of course, that the principles advocated in this paper are not new but are the accepted guides in the treatment of acute pelvic suppurations by the majority of surgeons in this country, yet it is surprising how many cases we see in consultation and hospital work where these patients have been improperly treated.

I wish therefore to make a plea for the more careful study by the general practitioner of the indications for operation in these cases. In my experience, I have found too often that no attempt has been made to classify the type of the phlegmon, and because the patient has a mass that can be palpated through the vagina, associated with temperature, an unnecessary and harmful operation is performed.

In conclusion, I wish to call to your attention and to emphasize the following points:

1. That a large proportion of the cases of parametritic exudate following labor or abortion, and many cases of perimetritis, will resolve without abscess formation if let alone, and that if pus does form, if in small quantity, it may be absorbed and frequently with the preservation of function of the pelvic organs.

2. That the too ready resort to the curet, or to other intrauterine manipulations, at the onset of uterine infection is responsible for the formation of exudates in a very large percentage of cases.

3. That many cases are operated upon unnecessarily, or too early, with the result of increasing or disseminating the infection, thus prolonging the convalescence and sometimes producing a fatal termination.

4. That incision and drainage should not be employed until the indications of a localized collection of pus are well defined and associated with evidences of septic absorption.

5. That the selection of the proper form of drainage applicable to each case is important. Rubber tubing or gauze should be chosen according to the conditions found at the operation.

6. That failure to cure a pelvic abscess by colpotomy and drainage is nearly always due to neglect in not keeping the incision open sufficiently long.

7. That in acute pelvic suppurations, when the indications for interference are present, the operation of choice should be a simple incision and ample drainage, with the object of conserving the organs.

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SERUM STUDIES IN PREGNANCY.

I. A Study of the Specificity of Ferments in Pregnancy by Means of Local Skin Reactions.*

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The probable rôle of anaphylactic processes in pregnancy has attracted attention for several years especially in relation to the toxemias, as eclampsia, and to the mechanism involved in the onset of labor.

Attempts to demonstrate antibodies in the blood serum of pregnant animals by complement-fixation and precipitin tests have generally failed. Based upon the fact, demonstrated by Veit, Schmorl and others, that during pregnancy syncytial cells may gain entrance to the maternal circulation. Abderhalden has advanced his now well-known theory that these cells and their products are received as foreign invaders and call forth the production of "protective ferments." His investigations have renewed interest in the subject of anaphylaxis in general and particularly has given some support to the hypothesis that anaphylactic reactions may bear a relation to the mechanism involved in the onset of labor and the pathology of pregnancy.

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Whether or not we regard Abderhalden's "protective ferments" in the serum of a pregnant animal as specific ferments for placental protein or but an increase of normal and general proteolytic ferments, practically all observers agree that they are to be found with regularity and in a relatively large amount in the later stages of pregnancy.

Whether it is the placental protein that is digested *in vitro* by these ferments as determined in the dialysis and optical methods of Abderhalden with the production of amino-acids and other products of protein digestion, or whether the placental tissue acts simply as an absorbent, removing the unsaturated fatty acid compounds and thereby releasing a tryptic ferment normally present in the serum but increased in pregnancy which then proceeds to digest the patient's own serum, as based upon the investigations of Jobling and Peterson and others, are problems relating to the mechanism of anaphylatoxin production itself. The results of our own investigation will be given in a subsequent communication. As it is apparent that proteolytic digestion occurs through the agency of a lytic body either in the nature of a tryptic ferment or of an amboceptor, the question at hand is the probable relation which this antibody-like ferment bears to the physiology and pathology of pregnancy and whether it is a general proteolytic ferment as maintained by Williams and Pearce and others or a specific ferment in the sense of Abderhalden and his co-workers.

Granting therefore, that mobilization of proteolytic ferments occurs during pregnancy the object of our investigation was to determine: First, if extracts of placenta injected intracutaneously or applied to the abraded skin of pregnant women would be followed by the train of phenomena generally recognized as a local anaphylactic or allergic reaction and ascribed to the action of a proteotoxin. According to a widely accepted theory the local and general phenomena or anaphylaxis are caused by an anaphylatoxin or protein poison, derived from the protein antigen or anaphylactogen through a process of protein cleavage or digestion by means of a specific lytic antibody and a complement. Our object was to determine if this cleavage could be detected *in vivo* in the form of a local anaphylactic reaction. Second, if such a reaction occurs whether it is due to specific or general ferments and under what circumstances it would occur.

The question of the relation of anaphylaxis to labor was studied experimentally by Sauerbruch and Heyde(1) who found upon attaching together in parabiosis pregnant and nonpregnant rats that all was well until the onset of labor when the nongravid animals developed convulsive seizures, suggestive of uremia, and not infrequently died. As a result of these observations Heide(2) took up the subject and injected placental serum intravenously into twenty-one pregnant women at term or during labor. In thirteen cases labor was hastened, or weak pains and uterine contractions intensified; in eight cases the results were negative. In the following year Rongy(3) reported even better results with nineteen cases, using the technic of Heide. From the fact that the mental factor attending an intravenous injection itself may considerably influence a woman in labor or at term regardless of what is injected, one of us, Kolmer(4), studied the subject experimentally in pregnant guinea-pigs, as intravenous injections may be given these animals with very little handling and trauma and the mental factor largely eliminated. After injecting pregnant guinea-pigs at or very near term with pig placental serum, pig maternal serum and human maternal and placental serum the results were regarded on the whole as negative, although a few animals did fall into labor shortly after the injections. The intravenous injections of a placental extract (guinea-pig) was followed by labor in two of the three animals used. With the assistance of Drs. Anspach and Narr, human placental serum was injected subcutaneously into eight pregnant women near term or in labor in doses varying from 10 to 30 c.c. with practically no effect, either upon the uterus or in general that could be ascribed to the serum.

Fromme (5) used fetal serum applied to the abraded skin or injected subcutaneously in pregnant women with negative results. With fresh ox serum, however, he observed a number of reactions consisting of an edematous, red and tender swelling at the site of injection. These negative results with fetal serum led him to believe that the mother is not sensitized by fetal products during the period of normal gestation.

Esch(6) observed negative results with fetal serum. Later Esch(7) injected pregnant women intra- and subcutaneously with horse serum and placental extract with negative results, and also showed that the urine of parturient women does not become highly toxic as does the urine of animals during anaphylactic shock. He advanced these results against Heide's theory that labor is a form of anaphylactic reaction due to the sensitization by the proteids of the fetus or placenta.

Lately Engelhorn and Wintz(8) have reported positive results in a small series of pregnant women following the application of *placentin* to an area of abraded skin. They gave no account of the preparation of their *placentin* except to state that the process was intricate. Esch(9) used expressed whole placental juice as well as the globulin and albumin fractions in the same manner with questionable results. De Jong(10) prepared a 10 per cent. watery suspension of dried hog placenta and injected 0.1 c.c. intracutaneously into a series of animals. In both pregnant and nonpregnant animals a slight infiltration of the tissues followed. He then dropped small amounts of the same material upon the conjunctiva of the animals with indefinite results. Further work led him to believe that the maternal antigen as he called it was either nonirritating or not seized upon and digested and concluded that the method had no practical value.

Falls and Bartlett(11) used aqueous, saline, and acid extracts, and glycerine emulsions of placenta in a series of thirty-three cases. These preparations were used intra- and percutaneously; and in both pregnant and nonpregnant persons caused a certain degree of reaction. The difference was not considered sufficient to be of value in diagnosis, and the absence of a pronounced general reaction was taken as evidence that the pregnant woman was not specifically sensitized to placental proteids.

ORIGINAL INVESTIGATIONS.

Placental Extracts (*Placentins*).—We have prepared a number of placental extracts of fresh full-term placentas in several ways, our object being to disrupt the cells and secure the cellular tissue as finely divided and unchanged as possible. To this end placental tissue was washed, thoroughly ground, subjected to high pressure and the juice so obtained concentrated and preserved. Glycerine extracts were also prepared and used for cutaneous inoculation. The exact technic of preparing the several extracts will be given later.

Control Extracts.—Early in this investigation we were impressed with the necessity of controlling the work not only by using the *placentins* in non pregnant persons but also by using control extracts prepared from another tissue in pregnant women. To this end a salt solution was prepared by evaporating to one-half volume 200 c.c. of normal salt solution containing 0.05 per cent. glycerine and 0.25 per cent. tricresol and used in controlling *placentin* No. 1 which was prepared by concentrating placental juice after the same manner. We also prepared and used extracts of beef kidney and human male and female kidney in exactly the same manner as the several *placentins*.

Patients.—Our patients may be divided into three groups as follows:

(*a*) Pregnant and puerperal women.
(*b*) Nonpregnant women, who have been pregnant one or more times.
(*c*) Controls, women who claim never to have been pregnant, and men.

Methods of Administration and Dosage.—The *placentins* and *nephrins* were employed diluted and undiluted, mostly in doses of 0.05 c.c. and never over 0.1 c.c., in order to reduce trauma to a minimum. All injections were given with a fine (No. 26 gauge) needle.

Glycerine and watery extracts were also employed after the manner of applying the cutaneous tuberculin test.

Reactions.—Local reactions characterized by erythema, edematous infiltration and pain were frequently observed not only with the *placentins*, but also, as will be pointed out later with the controls. The reactions were generally recorded twenty-four hours after the inoculation. With few exceptions the patients did not complain of pain in the axilla and in no instance were general reactions observed, although one of us experienced slight headache and malaise after intracutaneous injection of the *placentins* and *nephrins*. In colored persons the erythema could be seen, but not accurately measured. In many of these persons we were able to detect infiltration without noting erythema.

RESULTS WITH PLACENTIN NO. I.

Preparation.—Recently delivered placentas were trimmed of the cords and membranes, cut into small pieces, washed in warm water and passed through a meat grinder. The minced tissue was then washed for twenty-four hours in running water until quite free of blood, and as white as possible. After squeezing out the excess of water the tissue was ground in mortars with sterile powdered quartz and the finely divided pulpy material pressed at 200 pounds in a Buchner hydraulic press. The clear yellowish and opalescent fluid so obtained was centrifuged at high speed to remove particles of quartz, filtered through hard filter paper; measured and 0.5 per cent. glycerine and 0.25 per cent. tricresol added as a preservative. This juice was then concentrated to one-half volume at 40° C. during which a light precipitate was thrown down. The clear supernatant fluid was pipetted off, filtered through sterile paper and a sterile Berekfeld filter, its sterility tested by culture, and injected subcutaneously in rabbits. After having been proved sterile, this undiluted *placentin* was injected intracutaneously in doses of 0.05 c.c.; also diluted 1 : 10 in the same amount.

The results observed with this *placentin* and the control fluid are as follows:

1. Accepting infiltration of the tissues as the most constant sign of a reaction, since erythema may not readily be appreciated in colored women, it was found that 87 per cent. of eighty women who were pregnant or recently delivered reacted positively with this *placentin*. The reactions were usually well defined and easily read.

2. The significance of these reactions is lessened by the fact that 52 per cent. of these women tested with a control fluid prepared in the same manner as the *placentin*, reacted positively.

3. Of twenty-one women who were either delivered six months or more prior to these tests or who claim never to have been pregnant, fourteen or 66 per cent. reacted positively with the *placentin* and three or 14 per cent. with the control fluid. It may be stated that eleven of these women who claim never to have been pregnant were in the venereal wards of the Philadelphia General Hospital with syphilis or gonorrheal urethritis or vaginitis and had been exposed to impregnation.

4. In general the reactions with the control fluid occurred in those women who reacted with the *placentin*.

5. This *placentin* and the control fluid were also injected in the same dosage and manner in thirty men (102–132). In six or 20 per cent. a slight area of erythema (0.5 to 1 cm.) and infiltration followed.

6. We are inclined to believe that the glycerine in our extract acted as an irritant, this action being especially well marked in pregnant women whose skins were hypersensitive.

On the basis that many of these reactions were caused by an irritant action of the glycerine and tricresol contained in the *placentin* and control fluids, intensified by a hypersensitiveness of the skin in pregnancy, another series of persons were tested with these fluids diluted 1 : 10 with normal salt solution. In this dilution the control fluid did not give any reactions at all and in order to control the *placentins* with other tissue extracts two kidney extracts or *nephrins* were prepared of beef and human male kidney in a manner as similar to the *placentin* as we were able to prepare them.

The employment of these extracts yield the following results:

1. With the diluted *placentin* 80 per cent. of the women tested who were either pregnant or recently delivered reacted positively. As

a general rule, the reactions were weaker than those obtained with the undiluted *placentin.*

2. Of six women who had borne children three or 50 per cent. reacted positively.

3. Of four women who claim never to have been pregnant three reacted positively.

4. Two of the ten women who were pregnant or recently delivered reacted slightly with an extract of human male kidney.

RESULTS WITH PLACENTIN NO. 4.

In order to further eliminate the question of traumatic reactions with extracts preserved with glycerine and tricresol, another *placentin* was prepared as follows: Placental juice was obtained in exactly the same manner as described in the preparation of *placentin* No. 1, filtered through paper and evaporated to one-half volume at 40° C. preserved with chloroform vapor. The supernatant fluid was then filtered four times through hard filter paper to remove the chloroform and then filtered once through a sterile Berkefeld filter. The resulting clear yellowish fluid was preserved with 0.25 per cent. tricresol and injected intracutaneously in doses of 0.05 c.c. Glycerine was not added and the minimum quantity of tricresol is in itself devoid of irritant action when injected intracutaneously.

An extract of human female kidney (*nephrin*) was prepared at the same time and in the same manner and injected in a similar dose.

The following results were observed:

1. Of the forty women who were either pregnant or recently delivered at the time of the tests, sixteen or 40 per cent. reacted positively with the *placentin.* Thirteen of these women were also tested at the same time with the extract of human female kidney and five or 38 per cent. gave a positive reaction. In general these reactions were weaker than those observed with *placentin* No. 1, due we believe, to the absence of glycerine.

2. Of twenty-two women who had been pregnant one or more times prior to these tests, three or about 14 per cent. reacted positively and nineteen or 86 per cent. reacted negatively. Seventeen of these women were also tested at the same time with the *nephrin* and seven or 42 per cent. reacted positively and ten or 49 per cent. reacted negatively.

3. Of three women who claim never to have been pregnant, one, a colored woman of thirty-eight years, reacted positively with both the *placentin* and *nephrin.*

4. Eight men (217–224) were also injected with this *placentin* and *nephrin;* all of these reacted negatively with the *placentin* and three showed a slight erythema and infiltration with the *nephrin.* This shows that the *nephrin* was probably more irritant than the *placentin* and tends to explain the higher percentage of reactions among women who were not pregnant at the time these tests were made.

5. As will be noted the percentage of reactions among pregnant and recently delivered women with this *placentin* was lower than that observed with *placentin* No. 1. Whether this difference was due to the absence of an irritant action due to the glycerine or whether the glycerine served to extract a principle in the first *placentin* which was absent in this one we are unable to state. Since, however, the first *placentin* when diluted 1 : 10 gave a higher percentage of reactions (80 per cent.) it is probable that the glycerine serves to extract an antigenic principle.

RESULTS WITH PLACENTIN NO. 2.

Preparation.—While evaporating to one-half volume the placental juice prepared as described in the preparation of *placentin* No. 1, a finely divided precipitate was deposited on the sides and bottom of the dish, composed of material so finely divided as to stay in suspension after centrifuging and filtering the juice through hard paper, but which was thrown down as a result of evaporation and concentration.

Evaporation was continued until the residue was a thick pulpy mass. 2.5 grams were suspended in 100 c.c. of sterile normal salt solution. The resulting suspension was probably composed of very finely divided particles of placental tissue; when completely dried the material contained 5.39 per cent. nitrogen (12).

This *placentin* was injected intracutaneously in a dose of 0.05 c.c. and the effects noted after twenty-four and forty-eight hours.

As a control a similar suspension was made of the residue obtained in the preparation of a *nephrin* from human male kidney; this was injected intracutaneously in a dose of 0.05 c.c.

The results following the use of these preparations are as follows:

1. Of forty pregnant or recently delivered women, twenty-two or 55 per cent. reacted positively; in this same group the *nephrin* caused a positive reaction in 20 per cent.

2. Of nine women who had been pregnant one or more times prior to the tests, five or 55 per cent. reacted positively with the *placentin,* and three or 33 per cent. reacted positively with the *nephrin.*

3. In all instances the positive *nephrin* reactions occurred among women reacting positively with the *placentin.*

4. Two women, claiming never to have been pregnant, reacted negatively with both the *placentin* and *nephrin.*

5. Of twenty men (277–296) tested with *placentin* No. 2, four or 20 per cent. showed a small area of erythema and very slight infiltration twenty-four hours later. All except three of these men were suffering with gonorrhea or syphilis.

RESULTS WITH PLACENTINS NOS. 3–5–6.

Glycerine Extracts.—These glycerine extracts of placental tissue were prepared and tested by cutaneous inoculation after removal of a small area of skin with a von Pirquet borer. A control scarification was made on the same arm, the *placentin* being applied to the lower abrasion.

The reactions were recorded as negative when the *placentin* and control sites were equal in appearance and diameter; when the *placentin* site showed an areola of erythema this was measured in millimeters.

Preparation.—Placentin No. 3. This was prepared by rubbing up in a mortar equal parts of *placentin* No. 2 (residue from placental juice) and neutral glycerine. It constituted therefore, a suspension of No. 2 in glycerine rather than a true glycerine extract.

Placentin No. 5. To 100 grams of fresh finely minced and washed placental tissue 75 c.c. glycerine and 225 c.c. of normal salt solution were added and the mixture incubated at 37° C. for two weeks. At the end of this time the fluid portion was filtered and evaporated to one-half volume, the resulting fluid now being a 50 per cent. glycerine extract.

Placentin No. 6. To 190 c.c. of placental juice 10 c.c. of glycerine were added and the mixture incubated at 37° C. for two weeks. At the end of this time the fluid was filtered through paper and evaporated at 40° C. to 20 c.c.; the *placentin* was now a 50 per cent. glycerine extract.

These extracts were used with the following results:

1. *Placentin* No. 3 was tested upon forty-five persons (297–341), chiefly women who were pregnant or recently delivered. All reacted negatively except two, (*a*) a woman at term whose *placentin* reaction measured 4 mm. in diameter more than the control reaction, (*b*) a woman delivered of a full-term child twenty days previously whose *placentin* reaction measured 6 mm. in diameter more than the control site.

2. *Placentin* No. 5 was tested upon twenty-two persons (342–363), (*a*) of eighteen pregnant or recently delivered women, nine or 50 per cent. reacted positively showing an areola about the *placentin* site measuring from 4 to 16 mm. in diameter more than the control site, (*b*) two women who had borne children several years previously reacted negatively, (*c*) two women, claiming never to have been pregnant, reacted negatively. This *placentin*, a true glycerine extract of placental cells, yielded the largest number of positive reactions.

3. *Placentin* No 6 was tested upon twelve persons (364–375), mostly pregnant and recently delivered women; all reacted negatively except three, these being women at term whose *placentin* reaction measured 3, 5, and 7 mm. in diameter more than their respective control reactions.

4. *Placentin* No. 1 was also tried locally with five women at term (376–380) all reacting negatively.

RESULTS WITH PLACENTAL PEPTONE.

A 1 per cent. solution of placental peptone (Farbwerke-Hoechst Company) in normal salt solution was prepared and filtered through a sterile Berkfeld filter. This solution was injected intracutaneously in 0.1 c.c. amounts in fourteen women (371–394), ten of whom were pregnant or recently delivered, with negative results. Whether this peptone which was secured for the optical method of the Abderhalden reaction, was prepared from human placenta we are unable to state; it is of much interest to note, however, that this amount of placental peptone when injected intracutaneously was nonirritant and if seized upon and digested by the "protective ferments" there were no evidences of this action in the form of a local irritant action due to an anaphylactoxic substance or proteotoxin.

SUMMARY.

1. A *placentin* No. 1 prepared by concentration of expressed placental juice, preserved with 1 per cent. glycerine and 0.5 per cent. tricresol and injected intracutaneously yielded skin reactions characterized by erythema, infiltration and pain in 87 per cent. of pregnant and recently delivered women, and in 66 per cent. of women who had borne children, but who were not pregnant at the time these tests were made. This extract also caused 20 per cent. of the men tested to react slightly.

2. When diluted 1:10 with normal salt solution this extract

yielded 80 per cent. positive reactions among pregnant or recently delivered women, and 50 per cent. positive among women who had borne children.

3. A *placentin* (No. 4) prepared in the same manner as the first extract except that glycerine was not used in its preparation or preservation, yielded 40 per cent. positive reactions among pregnant or recently delivered women, and 14 per cent. positive reactions among women who had borne children. It is probable that glycerine itself acts as an irritant, especially in the hypersensitive skin of pregnant women.

4. A *placentin* (No. 2) prepared from the residue resulting from the concentration of expressed placental juice yielded 55 per cent. positive reactions among women who were pregnant or recently delivered. This *placentin* produced slightly positive results in 20 per cent. of the men tested.

5. A glycerine extract (*placentin* No. 5) upon cutaneous inoculation yielded 50 per cent. positive reactions among pregnant and recently delivered women. Of several multiparous and nulliparous women tested, all reacted negatively.

6. Extracts of human male and female kidney (*nephrins*) prepared in the same manner as the *placentins* produced a number of positive reactions among pregnant, puerperal, multiparous and nulliparous women. The most marked reactions were observed with the extract of human female kidney.

7. The intracutaneous injection of a 1 per cent. solution of a placental peptone did not produce reactions among pregnant and recently delivered women.

DISCUSSION.

Without at this time entering upon a general discussion of the mechanism of anaphylaxis and the nature of the substrat in anaphylatoxin production or the action of the "ferments" in the serum of pregnancy in this process, the results of this study indicate that during pregnancy there is an increase of a general proteolytic ferment rather than the production of a ferment specific for placental protein alone. Whether this increased tryptic power of the serum in pregnancy is due to a simple increase of normal tryptic ferments or to the production of new proteolytic and amboceptor-like bodies of a general nature capable of attaching not only the proteids of placental but of other body cells as well, is being studied and will be reported upon in a subsequent communication. At present it may be stated that these "ferments" have several of the characters of amboceptors and their lack of specificity is comparable to the lack of specificity of the cytotoxins in general.

While we have naturally hesitated to report upon these local skin reactions in pregnant and puerperal women until a relatively large number were studied, in view of the contradictory results obtained by others we feel justified in concluding that the reactions were anaphylactic in nature and due to an anaphylatoxin produced by the action of general ferments upon a protein substrat.

We have not been primarily interested in the question of the practical diagnostic value of a skin test for pregnancy and have merely recorded the results as observed. We do not believe at present that this reaction possesses a practical value in diagnosis, certainly not among women who have borne children.

We wish to express our thanks to Dr. Barton Cooke Hirst, Dr. Richard C. Norris, Dr. Brooke M. Anspach, and Dr. E. Hollingsworth Siter for the clinical opportunities afforded us.

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121 SOUTH TWENTIETH STREET.

GYNECOLOGY: PAST—PRESENT—FUTURE.

BY
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WHAT is to become of that branch of medicine known as gynecology? Is it in its infancy or second childhood? I am afraid the majority believe in the latter state of its existence, but for reasons that I shall try to make clear I sincerely trust they are mistaken. As an introduction let us casually look back and see what gynecology and followers of that particular branch of medicine have contributed to make medicine and surgery what it is to-day, and let us realize to how great an extent we are indebted to these men for their teachings.

Smellie was a prominent gynecologist and obstetrician, lending his efforts to the development of the obstetrical forceps and publishing a book on midwifery in 1752. Credé first used silver nitrate as a prophylactic and cure in ophthalmia neonatorum, an immeasurable service to humanity; besides he gave us some obstetrical methods which have not been improved upon. Semmelweiss and Oliver Wendell Holmes are remembered for their teachings as to puerperal infection. Ephram McDowell was the pioneer ovariotomist. Porro is famous for the Cesarean section which bears his name and Sänger for his contribution to the advance in obstetrical and abdominal surgery. Sir James Y. Simpson introduced ether anesthesia in obstetrics in 1847 and discovered chloroform in the same year. Emmett, Sims, Dührssen, Kelly, Wertheim, and many other latter day gynecologists too numerous to mention claim our grateful acknowledgments.

It is seen at a glance that in the past, gynecology and obstetrics have been inseparably interlocked in their greatest advances and so it will be in the future. Such a circumstance was inevitable and is a necessity for their best development in the future. The two branches dealing with the same sex and organs and frequently with the same secondary or overlapping primary condition, must be fully understood and appreciated by the medical attendant whether he call himself gynecologist or obstetrician.

In the past generation it was the practice of many excellent men to devote themselves almost if not entirely to gynecology in their practice and teachings, overlooking in many instances the etiological factors of the conditions they were treating, which were as often as not obstetrical in origin. At the same time obstetrics was more often handled by the general practitioner, but often in such a large series of cases that the doctor became known principally as an obstetrician, and he was interested in and judged by his maternal and infant mortality and their immediate morbidity. He often failed to realize the latent damage he did or allowed nature to do. If the mother and infant lived and the former was able to get up and be about her usual duties in an unusually short time, the more was his credit. Lacerations were left to granulate, heavy uteri were left in any position, the catheter was the first aid to the uncomfortable; so long as the breasts secreted a sufficient quantity of milk they were not otherwise considered; if the mother had fever it was "milk fever" and considered physiological, and so I might continue, but little did he believe or correlate the backache, headache, pelvic pain, menstrual disturbances, cystitis, pelvic inflammation, neuroses, cardiac lesions, arthritis, subsequent sterility, etc., of which frequently the patient subsequently complained, as in any way due to her former labor or puerperium; and, after a longer or shorter effort of the practitioner to alleviate her discomfort the patient found her way to the gynecologist or continued to suffer—sometimes she did both.

It is significant to note that the foremost gynecologists were also trained obstetricians, and though they frequently did not continue large obstetricial practices, they had their training in the school of experience, their insight was keen, their perceptions acute, their deductions correct, and they correlated obstetrical misdemeanors and accidents with subsequent gynecological conditions. I do not mean to infer that the sole effort of the gynecologist was to repair the damage of previous labors or puerperiums; such was far from the case. They were, many of them, pioneers in general surgery, and for this there was a very good reason.

Previous to and in the early era of asepsis vastly more perineal and pelvic surgery was done than was attempted elsewhere in the body. This was possible because so much gynecological surgery was physically superficial, the parts possessed of a greater amount of natural resistance, and easily drained, and under these circumstances it could be undertaken with so much less risk and with a lower mortality than surgery of the upper abdomen and other deep or less resistant parts. Thus the gynecologists were the surgeons with the largest experience, they were possessed of excellent technical skill, and therefore when advance was made it was quite natural that these men would be the ones to make many important contributions.

The gestation period of the general surgeon was short, and there rapidly developed operators who technically were excellent, and who, aided by the strides in surgical technic, part of which they developed, were able to operate with a decreasing and not prohibitive mortality. Many of these men developed their technic, ingenuity and operative skill and reduced their mortality at the expense of diagnosis and the justification of operation, believing it quite as satisfactory to "look in" and see what they had, and failing to consider whether the patient would be sufficiently benefited to justify operation.

Delay is dangerous, fatal in some cases, but medical and surgical science is impossible of as rapid or sound advance without as painstaking consideration and study preoperative as during the operation, and we must all of us study when and why operate, as well as how to operate, and by so doing we will best serve our chosen profession and humanity in general.

It is quite true that some gynecologists have taken up general surgery, but the proportion is relatively small compared to the general surgeons who do gynecology—in fact, there are but few of the latter who do not include pelvic surgery of women in their field, and with a glance into the future one can see the end of gynecology as a specialty unless there are radical changes.

So far as the actual operation is concerned the general surgeon is usually quite competent and capable of caring for these cases, though it is my own observation and opinion that in the plastic work especially, the gynecologist excels even as an operator. However, when it comes to diagnosis, from the history and physical examination, when and how most conservatively to operate, macroscopic and microscopic examinations of the tissues inspected at operation or excised, and the most accurate prognosis, it is here that the good gynecologist is invariably the superior of the good general surgeon.

Obstetrics has become a science as well as an art. Nowhere does one find cases presenting more diversified conditions or urgent emergencies. What, when, and how to care for these emergencies severely tests the judgment, skill, ingenuity and experience of the best trained obstetrician who must have at his immediate command mechanical ability, biological chemistry, major surgical skill, dexterity, and medical judgment, as well as extensive obstetrical experience. I know of no field so large or presenting such varied problems for experimental investigation and research that offers such interesting study or large rewards as that of obstetrics.

Here it is perhaps opportune that I say a word regarding surgical pathology. Here is the line along which surgery in general is to see its next great advance, and at present it is sadly neglected. Considering what a tremendous amount of material surgeons secure, what a pitifully small proportion is carefully studied and observations and statistics recorded. The explanations are several: first, the operator with a few exceptions knows little or nothing about surgical pathology other than a rough guess as to the tissue characteristics in the gross. This in turn is due to a lack of training in pathology as an underlying principle in all medicine, and a failure to recognize the great importance of such a pathological study of the tissues removed. Then also the busy surgeon has not time to do this work, in which case, unfortunately, he is also unable to direct or supervise younger men in this fascinating line of study. Fortunately this is not invariably the case and some of the best and busiest surgeons have their material carefully studied and reported, and I will dare suggest that these studies and the knowledge gained from them have contributed materially to the success of these men.

Necessary as is the development of general surgical pathology to the real advance of general surgery, how equally necessary is the further development of gynecological pathology to the progress of gynecology. Lack of space prevents dilatation on this subject, but one might in a sense liken the neglect to study pathological material to priceless collections of the arts or sciences which are lost before being studied or recorded, or before adding one iota to the science for which, at the expense of suffering, deprivation and death they were made.

There is another plea for the continuation of that specialty dealing with the physiology and pathology peculiar to women. These fields are so extensive, so differentiated from those of adjoining parts, in such close approximation, with so little neutral territory or with actually overlapping boundaries, so variable in seasons, extent, and boundary, that they require the constant, continual, and undivided observation and study of those interested in these particular sections.

Now to briefly summarize these few inadequate remarks and generalizations. At present general surgeons almost invariably include gynecology in their routine operative undertakings and frequently, I am afraid, with uncertain or incorrect diagnosis, and resulting unnecessary, mutilating or inadequate operations, and with but mild interest in the future of these patients and their complaints, so long as they leave the hospital recovered from their operation. Gynecologists, on the other hand, are tempted to invade the general surgical field, partly at least, to make up for the cases lost in their chosen specialty to the general surgeons, and here the same criticism is to be made as of the general surgeon doing gynecology.

There are also many men doing gynecology as a specialty who have had but little obstetrical experience and their understanding of their cases, their results and their patients suffer. Besides, not fully realizing the relationship between obstetrics and gynecology they do little or nothing to point out the resulting mistakes made and aid in their elimination. The obstetricians in turn often fail to see themselves as etiological factors in subsequent gynecological lesions, they are frequently ill trained to cope with major surgical emergencies or serious medical complications.

What can be the solution of such conditions as these? Let the general surgeon exclude gynecology and obstetrics from his field and devote his entire time and resources to the development of general surgery; have gynecology and obstetrics combined, taught, studied and investigated by the same individual. It is a big subject, offering innumerable opportunities and will claim their every resource.

A final word—let every one interested in the advance of medicine, the understanding of the conditions he deals with and the welfare of his patients, build his specialty on a solid foundation of pathology, and the higher he builds, let him ever refer and consider the foundation which needs continual examination, and frequent strengthening if he wishes to uphold and make permanent that which he has built.

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ON THE FORTUITOUS ORIGIN OF DEPARTURES FROM THE NORMAL PERIOD OF GESTATION IN MAN.*

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I HAVE recently carried out an investigation which had for its object the determination of the latter portion of the curve of prenatal growth and the first three weeks of the curve of postnatal growth in man from the weights of infants born somewhat prior to or later than the normal period of gestation. The main results of this investigation will be published elsewhere but incidentally, during the course of the investigation, a number of interesting and suggestive facts concerning the variation of the period of gestation in normal females presented themselves and it appears desirable that these facts and the deductions which may be drawn therefrom should be separately placed on record.

It has been shown by Read(1) that a certain period in the intrauterine growth of guinea-pigs, preceding normal birth by a fairly definite interval, constitutes a "critical period" in the growth of these animals, since interruptions to growth and loss of weight of the fetus followed by premature delivery are especially liable to occur at this period in females which would appear to be in every other respect normal. In other words, the frequency curve of the period of gestation in guinea-pigs is "bimodal." On tabulating the percentages of deliveries at different periods of gestation *two* groups of maximum frequency are seen to occur, a smaller "premature" group rather definitely situated and a larger "normal" group separated from the former by a period in which deliveries are relatively infrequent.

I have sought to ascertain whether or not a similar "critical period" occurs during the latter months of pregnancy in man and despite the opinion to the contrary which is, I believe, held by certain obstetricians, I have failed to detect any evidence of "bimodality" in the frequency curve of the period of gestation in *normal* females. The impression that the frequency curve of the period of gestation in man

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* From the Rudolph Spreckel's Physiological Laboratory of the University of California.

is bimodal (*i.e.*, that premature deliveries tend to occur with maximum frequency at a certain period) must take its rise, if it is founded on fact, from a tendency for *abnormal* females (*i.e.*, females afflicted with syphilis or other pathological conditions) to deliver at a period rather definitely antedating the normal term. My data throw no light upon this question since they concern only normal females.

The data which I am about to enumerate were exclusively obtained from "The Queen's Home," a maternity hospital in Adelaide, South Australia, the admirably kept records of which were very kindly placed at my disposal by Dr. H. Gilbert and the Matron, Miss E. C. Sketheway, to whom I desire to express my very great indebtedness. The data cover the years 1909–1913.

Patients, upon admission to this hospital, pay a small and frequently nominal fee, the fee being in many cases adjusted to the income of the patient. The patient secures admission through the recommendation of the doctors in charge of the case. Unmarried mothers are not admitted. The mothers belong, therefore, to the laboring and lower artisan classes.

The mother is usually admitted as near as possible to labor, and then remains in the hospital for fourteen days after the birth of the infant. The infant is weighed without clothing, at birth and again upon discharge. The weights are recorded in ounces (1 ounce = 28.34 grams) to the nearest ½ ounce.

The period of gestation, when ascertainable, is indicated on the patient's record, the date recorded being that of the onset of the last menstruation. In tabulating the data only those (about two-thirds of the actually recorded data) were employed for which this date was accurately indicated to the nearest day.

All cases were excluded in which the mother was suffering during pregnancy from any definitely ascertainable disease, *e.g.*, syphilis, tuberculosis, eclampsia, etc. Also those cases (relatively very few in number) were excluded in which the infant was deformed on delivery or died within one week after delivery. This procedure was necessary in order to exclude abnormal pregnancies in which the duration of the period of gestation might conceivably be affected by factors other than the physiological variables which determine the length of the period in normal females, *e.g.*, pregnancies accompanied by paternal syphilitic infection of the fetus, or pregnancies modified by excessive pelvic deformation in the mother.

The following (Tables I and II) were the results obtained, all infants born during the period between 275 and 285 days being tabulated as having been born at 280 days, all those born between 285 and 295 days as having been born at 290 days, etc. Those infants which were born upon the limiting day separating two periods (*e.g.*, 285 days) are included in both classes (*e.g.*, the 280-day and the 290-day classes).

TABLE I. MALES.

Period of gestation in days	Number of infants delivered	Period of gestation in days	Number of infants delivered	Period of gestation in days	Number of infants delivered	Period of gestation in days	Number of infants delivered
190	1	230	0	270	38	310	9
200	0	240	1	280	79	320	3
210	1	250	2	290	78	330	1
220	0	260	22	300	16	340	0
Totals	2		25		211		13

TABLE II. FEMALES.

Period of gestation in days	Number of infants delivered	Period of gestation in days	Number of infants delivered	Period of gestation in days	Number of infants delivered	Period of gestation in days	Number of infants delivered
190	1	230	2	270	32	310	14
200	2	240	3	280	80	320	3
210	0	250	6	290	86	330	1
220	1	260	10	300	31	340	0
Totals	4		21		229		18

In attempting to determine the mean or "normal" period of gestation from these figures we might employ the average of all of the different periods of gestation enumerated in the above tables. But in so doing we would incur the risk of including some few marked deviations from the average representing departures from the mean period of gestation which are not purely fortuitous and intrinsic in origin, but due to the intrusion of definite extrinsic variables such as undetected pathological conditions of the mother or infant or large errors, of which the most probable is an error of one month, in the estimation of the observed periods.

We might employ some arbitrary criterion, such as excessive subnormality in the weight of the infant delivered, for the exclusion of extreme deviations. But such a criterion would depend, not upon the magnitude of the period itself, but upon the magnitude of another variable, for example, the weight of the infant after delivery. For the purpose of obtaining the most probable estimate of the length of the normal period of gestation, however, such a procedure would not be strictly justifiable, since abnormal development of the infant may not necessarily influence the length of the period of gestation.

We are therefore led to inquire what procedure we can employ, depending solely upon the magnitude of the observed and apparently normal periods of gestation, which will enable us to exclude from the data enumerated in Tables I and II those of which the deviations from the mean are more probably due to extrinsic than to intrinsic variables, *i.e.*, which are probably due to determinate but undetected large errors of estimation, or to pathological conditions.

Such a procedure, determined solely by the observed magnitudes and not dependent upon any *a priori* considerations added thereto, is afforded by Chauvenet's criterion for the rejection of extreme variates,(2) which is widely employed in statistical investigations and physical measurements which involve a large number of determinations.(3) This criterion is evaluated in the following manner:

Referring to Table I, we observe that out of a total of 251 male infants, one was born at 190 days, one at 210 days, one at 240 days, two were born at 250 days, and so forth, the average period of gestation for all of these infants being 281.8 days.

We now determine the deviation of each of the observed periods of gestation from the above average. Thus the deviation of the 190-day period is 91.8 days, that of the 330-day period is 48.2 days, and so forth. Square each of these deviations, multiply each of these squares by the number of individuals displaying the deviation in question, and add the products together. Thus Table I yields:

$$91.8^2 \times 1 + 71.8^2 \times 1 + 41.8^2 \times 1 + 31.8^2 \times 2 + 21.8^2 \times 22 + 11.8^2 \times 38 + 1.8^2 \times 79 + 8.2^2 \times 78 + 18.2^2 \times 16 + 28.2^2 \times 9 + 38.2^2 \times 3 + 48.2^2 \times 1 = 74{,}319.$$

Divide this sum by the total number of infants (= 251) and take the square root of this quotient. The value thus obtained, 17.2, is the *standard deviation* of the period of gestation for the male infant. The standard deviation (usually denoted by the symbol σ) is a measure of the *variability* of any quantity provided that quantity only varies accidently, that is to say, in accordance with the laws of probability indifferently in excess and in defect of its mean value.(4)

When a series of magnitudes which deviate fortuitously from the mean are tabulated in classes, as we have tabulated periods of gestation in Tables I and II, we find that those classes (in Table I the 280- and 290-day classes) which lie nearest in magnitude to the mean contain the greatest number of examples, *i.e.*, exhibit the greatest "frequency." If we plot the frequencies of the classes vertically, employing their deviations from the mean as abscissæ, we obtain, as is well known, the "probability curve:"

$$y = \frac{n}{\sigma\sqrt{2\pi}}\, e^{-\frac{x^2}{2\sigma}}$$

in which n is the total number of variates (in this instance 251, the total number of infants), σ is the "standard deviation" determined in the manner outlined above, y and x are the ordinate and abscissa respectively, and e is the base of the Napierian logarithms.

The general form of this curve is familiar. The majority of the variates lie close in magnitude to the mean, and therefore the greater part of the area enclosed between the curve and the axis of the abscissæ lies close to the maximum ordinate, *i.e.*, that expressing the number of variates exactly equal in magnitude to the mean. The curve slopes away upon either side of the mean, at first rapidly and then more slowly. The abscissa of the point of inflexion is σ, the standard deviation.

Assuming for the moment what will be proven later, namely, that the observed deviations of the period of gestation from the mean are for the most part purely fortuitous and therefore lie upon or near to the probability curve, and having determined the "standard deviation" of the observed periods, we can now proceed to determine which, if any, of the observed deviations from the mean are probably not fortuitous in the following way:

Let x_1 be the magnitude of a given deviation, a, expressed in terms of the standard deviation, so that $\frac{a}{\sigma} = x_1$, then the integral:

$$\varphi(\sigma x_1) = \frac{2}{\sigma\sqrt{2\pi}} \int_0^{\sigma x_1} e^{-\frac{x^2}{2\sigma^2}}\,dx$$

expresses the proportion of variates of which the deviation from the mean is *less* than a. If we multiply this by n, the total number of variates, we obtain $n\varphi(\sigma x_1)$ which is the actual number of variates of which the deviation from the mean is less than a. Subtracting this from n we have:

$$n - n\varphi(\sigma x_1) = n[1 - \varphi(\sigma x_1)]$$

which is the number of deviations which must be expected to be *greater* than a. If now this quantity is less than ½ it will follow that a deviation of magnitude a has a greater probability against it than for it, and we may infer that among a limited number of *purely fortuitous* deviations it would not occur. Such a deviation from the mean we may therefore reject as being improbably fortuitous. The criterion for rejection is therefore obtained from the equation:

$$\varphi(\sigma x_1) = \frac{2n - 1}{2n}.$$

We have now to find the value of σx_1 which corresponds to an area of the probability curve equalling $\frac{2n - 1}{2n}$, where n is the total number of observations, in this instance 251. We can ascertain the value of x_1 by referring to tables of probability integrals (such as, for example, Table IV in Davenport's "Statistical Methods" referred to above).

We have $\frac{2 \times 251 - 1}{2 \times 251} = 0.99801$. One-half of this area lies on either side of the mean, while the tables of probability-integrals give the values of x_1 corresponding to given areas on *one* side of the mean. We therefore divide the above area by two, obtaining the area 0.49900. The table of probability-integrals shows that the value of x_1 which corresponds to this area is 3.09. Hence the limit of allowable deviation from the mean is given by:

$$a = \sigma x_1 = 17.2 \times 3.09 = 53.$$

This is therefore the maximum deviation from the mean period of gestation which may be expected to occur among 251 observations provided all of the observed deviations are fortuitous. Any period of gestation greater than 282 + 53 = 335 days, or less than 282 − 53 = 229 days may therefore be eliminated from the observations as being probably attributable to the intrusion of factors which are normally extrinsic. Referring again to Table I, we see that the 190- and 210-day periods may be rejected in computing the average magnitude of the period of gestation for males.

But in computing this maximum allowable deviation we began by assuming (in determining the "standard deviation") that the observed deviations from the mean were all fortuitous in origin. Nevertheless we have found that two of the observed deviations were probably not fortuitous, but due to the intrustion of some extrinsic undetected variable into the system of physiological variables which normally determine the length of the period of gestation. This renders a new application of Chauvenet's criterion necessary, in the carrying-out of which we exclude these two observations and treat the remainder of the observed periods as the basis of a fresh estimate of the "standard deviation," the area of the probability curve corresponding to the extreme allowable deviation, and so forth, until finally, by successive applications of Chauvenet's criterion, we eliminate all the observations of which the deviation from the mean (corrected by the omission of these values) are too great to be merely fortuitous, and obtain a series of estimates of the period of gestation, all of which may legitimately be regarded as representing fortuitous deviations from a fixed average value.

Treating data enumerated in Table I in this manner, we find that the *first* application of Chauvenet's criterion yields the limiting classes 229–335 days. The infants born at 190 and 210 days are therefore excluded. The *second* application of Chauvenet's criterion yields the limiting classes 242–322 days. The infants born at 240 and 330 days are therefore excluded. The *third* application of Chauvenet's criterion yields the limiting classes 243–321 days and leads to no further exclusions. We conclude therefore that with only four exceptions, namely the 190-, 210-, 240- and 330-day periods, all of the periods of gestation enumerated in Table I may be regarded as fortuitous departures from the true mean.

The number (N) of observed periods with the exception of those excluded by the above process is 247. The standard deviation (σ) for these periods is 12.7. The average of these periods is 282.5 days. The "probable error" of this estimate is given by $\pm 0.6745 \frac{\sigma}{\sqrt{N}} = \pm 0.55$, which means that the chances are even (1 to 1), that the true value of the mean period of gestation for males lies between 281.95 and 283.05 days(5).

Applying the same methods of computation to the data for female infants enumerated in Table II we find that the *first* application of Chauvenet's criterion yields the limiting classes 228–338 days. The infants born at 190, 200 and 220 days are therefore excluded. The *second* application of Chauvenet's criterion yields the limiting classes 241–329 days. The infants born at 330 days are therefore excluded. The *third* application of Chauvenet's criterion yields the limiting classes 241–327 days and leads to no further exclusions. We conclude, therefore, that with only seven exceptions, comprising the 190-, 200-, 220- and 330-day periods, all of the periods of gestation enumerated in Table II may be regarded as fortuitous departures from the true mean.

The number (N) of observed periods, with the exception of those excluded by the above process, is 264. The standard deviation (σ) for these periods is 13.8. The average of these periods is 284.5 days. The "probable error" of this estimate is ± 0.57. The chances are therefore even that the true period of gestation for female infants lies between 283.93 and 285.07 days.

From these results it appears that the *mean period of gestation for female infants is longer than that for male infants.* The probability of the truth of this conclusion, based upon the above number of weighings, is the inverse of the probability that either of the above estimates, namely, that of the period of gestation for male infants or that of the period of gestation for female infants, differs from the true mean by four times the "probable error" of the estimate of either mean, which is the extent of the divergency of the two estimates. Hence the probability of the truth of the conclusion derived from the above figures that the period of gestation is longer for female infants than for male infants is 142 to 1.(6)

It should be noted that the ordinary method of estimating the probable period of gestation, namely, that of adding seven days to the date of the onset of the last menstruation and subtracting three calendar months from that date in the following year, yields periods which vary in length between 280 and 283 days.

We have seen that with the exception of a very few extreme deviations from the mean, which there is every reason to suppose are not "physiological" in origin, all of the periods of gestation enumerated in Tables I and II are *not improbably* fortuitous deviations from the mean period. I will now proceed to show that the observed deviations constitute a fortuitous distribution of variates about a *single* maximum frequency.

The *unimodality* of the frequency curve(7) for the period of gestation is very clearly displayed by the following figures (Tables III and IV) derived from Tables I and II.

TABLE III. MALES.

Period of gestation in days	Percentage of all infants not excluded by Chauvenet's criterion (247) born at the designated period
250	0.8
260	8.9
270	15.4
280	32.0
	Mode
290	31.6
300	6.5
310	3.6
320	1.2
Total	1.00

TABLE IV. FEMALES.

Period of gestation in days	Percentage of all infants not excluded by Chauvenet's criterion (264) born at the designated period
240	1.1
250	2.3
260	3.8
270	12.1
280	30.3 Mode
290	32.6
300	11.4
310	5.3
320	1.1
Total	100.0

There is evidently only *one* period, the "normal" period, at which the percentage of infants delivered by normal mothers attains a maximum. Subsequently to a very early period in the development of the fetus, there is no evidence of a "critical period" in the intrauterine growth of man.*

The fortuitous character of the distribution of the observed periods about their mean may be demonstrated by comparing the distributions of frequencies enumerated in Tables III and IV with those of the "theoretical" frequency curve:

$$y = \frac{n}{\sigma\sqrt{2\pi}} e^{-\frac{x^2}{2\sigma^2}}$$

the constants n and σ being the number of variates and the standard deviation respectively the values of which have been evaluated

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* It may be contended that by excluding those infants which died within one week of birth I have excluded the very group of deliveries which might be expected to reveal bimodality of the frequency curve of the period of gestation. The deliveries thus rejected were, however, relatively few in number and displayed no special tendency to occur at a period differing from the "normal" period of gestation. Their rejection is rendered necessary by the fact that they represent not infrequently the fruit of pregnancies which are affected by maternal abnormality. Were there any decided tendency, however, for deliveries within the limits comprised in the accompanying tables (3 and 4), to fall into two groups, a certain proportion of the infants delivered at the abnormal period would certainly survive, since premature delivery within these or even more extreme limits is not an insuperable obstacle to subsequent development, and maldevelopment at a "critical period" of intrauterine growth, might be expected to occur in varying degrees, resulting in the delivery of many infants not sufficiently maldeveloped to render the maintenance of life impossible.

above, y the frequency of a given class and x its deviation from the mean.

This comparison is carried out in the accompanying tables (V and VI).(8)

TABLE V. MALES.

$\sigma = 12.7$; $N = 247$.

Period of gestation in days	Percentage of infants born at this period		δ = deviation of the observed from the theoretical value	$\left(\frac{\delta^2}{y}\right)$
	y = theoretical	y_1 = observed		
240	0.2	0.0	−0.2	....
250	1.5	0.8	−0.7	0.33
260	7.4	8.9	+1.5	0.30
270	19.8	15.4	−4.4	0.98
280	30.7	32.0	+1.3	0.06
290	25.1	31.6	+6.5	1.68
300	11.9	6.5	−5.4	2.45
310	3.0	3.6	+0.6	0.12
320	0.4	1.2	+0.8	....
Totals	100.0	100.0	±0.0	5.92

TABLE VI. FEMALES.

$\sigma = 13.8$; $N = 264$.

Period of gestation in days	Percentage of infants born at this period		δ = deviation of the observed from the theoretical value	$\left(\frac{\delta^2}{y}\right)$
	y = theoretical	y_1 = observed		
240	0.2	1.1	+0.9	....
250	1.6	2.3	+0.7	0.31
260	6.6	3.8	−2.8	1.19
270	17.4	12.1	−5.3	1.62
280	27.0	30.3	+3.3	0.40
290	26.0	32.6	+6.6	1.67
300	14.8	11.4	−3.4	0.77
310	5.2	5.3	+0.1	0.00
320	1.1	1.1	±0.0	0.00
Totals	100.0	100.0	+0.1	5.96

We have now to inquire what is the probability that the above "theoretical" curves of frequency truly represent the observed frequency distributions? In other words, what is the probability P that in a random selection of a like number of periods of gestation

(247 in the case of males, 264 in the case of females) a series of deviations from the above "theoretical" frequencies will be obtained which is as great or greater than that actually observed?

According to Pearson(9) in order to compute this probability it is necessary first of all to compute X^2, where:

$$X^2 = \text{sum}\left[\frac{\text{squares of deviation of observed from theoretical frequencies}}{\text{theoretical frequency}}\right]$$

excluding those deviations which correspond to "theoretical" frequencies of less than unity, *i.e.*, to percentage frequencies of less than 0.41 for the periods yielding males and of less than 0.38 for periods yielding females.

The value of P is then given by:

$$P = \sqrt{\frac{2}{\pi}}\int_x^\infty e^{-\frac{1}{2}X^2}\,dX + \sqrt{\frac{2}{\pi}}\,e^{-\frac{1}{2}X^2}\left(\frac{X}{1} + \frac{X^3}{1.3} + \frac{X^5}{1.3.5} + \ldots + \frac{X^{n-3}}{1.3.5\ldots(n-3)}\right)$$

if n be even, and by:

$$P = e^{-\frac{1}{2}X^2}\left(1 + \frac{X^2}{2} + \frac{X^4}{2.4} + \ldots\ldots + \frac{X^{n-3}}{2.4.6\ldots(n-3)}\right)$$

if n be odd, where n is the number of classes (7 for the periods yielding males, 8 for the periods yielding females) of which the theoretical frequency is greater than unity.

The values of P computed from the above formulæ corresponding to various values of X and n have been tabulated by Elderton.(10) Now for the periods of gestation yielding males we have found (excluding the 240- and 320-day periods of which the theoretical frequencies are less than unity = 0.41 per cent.) that $X^2 = 5.92$, while $n = 7$. The value of P in Elderton's table corresponding to these values of X^2 and n is 0.43; in other words, out of 100 random samples of 247 deliveries yielding males, forty-three of the samples will yield a series of deviations from the theoretical frequencies as great or greater than the sample actually observed. This means that the chances are forty-three in 100 that no theoretical frequency distribution could be found which would fit the observed frequencies better than that which we have employed. This means, of course, that the observed frequency distribution is probably correctly represented by a frequency curve of the type employed, namely, the normal "probability curve."(11) In other words, *the observed deviations of "Physiological" periods of gestation from their mean are fortuitous in origin.*

The corresponding figures for the periods of gestation which yield females are:

$$X^2 = 5.96; n = 8; P = 0.54.$$

The probability that this group of frequency distribution is correctly represented by the "probability curve," *i.e.*, is fortuitous, being even greater than in the case of the group yielding males.

From the above "theoretical" curves of frequency which, as we have seen, correspond very closely to the "observed" curves of frequency, we can readily calculate with the aid of tables, such as Table IV in Davenport's "Statistical Methods," what proportion of infants may be expected to be born at any given departure from the mean period. Hence we obtain, for males:

TABLE VII. MALES.

Among the following number of infants	One will be born Before or at	After or at
1,000	249 days	316 days
10,000	239 days	326 days
100,000	232 days	334 days
1,000,000	224 days	340 days

Hence the chances are *a million to one* against a male child being delivered at the termination of an otherwise normal pregnancy before 224 days after the onset of the last menstruation. It would appear legitimate to conclude, therefore, that *all seven-month children* (210 days) are the fruit of pathological pregnancies, *i.e.*, delivery is due to an abnormal condition of the fetus or parent induced by extrinsic occurrences, such as infection of the parent or fetus, mechanical injury or nervous shock to the mother, etc. It may be noted here, that according to Williams(12) well-developed children may be born at as early as 240 or as late as 320 days; presumably these, in his experience, are the extreme limits.

The corresponding figures for periods yielding females are given in the accompanying table:

TABLE VIII. FEMALES.

Among the following number of infants	One will be born Before or at	After or at
1,000	249 days	320 days
10,000	238 days	331 days
100,000	229 days	340 days
1,000,000	222 days	347 days

Hence the chances are *a million to one* against a female child being delivered at the termination of an otherwise normal pregnancy before 222 days after the onset of the last menstruation.

From the variability of the physiological period of gestation it is possible to draw important conclusions. We have seen that for periods yielding males the variability (standard deviation) is represented by 12.7 days which is 4.47 per cent. of the mean period (282.5 days). This means that 68.27 per cent. or, almost exactly, two-thirds of the observed periods of gestation are within 4.47 per cent. of the length of the mean period.* For periods yielding females the percentage variability is 4.85 per cent., which means that two-thirds of the observed periods of gestation yielding females deviate from the mean period by no more than 4.85 per cent. In this connection it is of interest to note that Williams(13) states that in his experience *two-thirds* of the young women who miss the first menstrual period after marriage give birth to a fully developed child at 280 days after the onset of the last menstrual period. This quantitative correspondence is assuredly not accidental.

Now I have also estimated the *percentage variability in weight* of the infants which were the fruit of the pregnancies enumerated in the above tables. Excluding infants delivered at the termination of the periods rejected by Chauvenet's criterion I find that the variability in weight of the male infants at delivery is 14.3 per cent., while the variability in weight of the female infants at delivery is 14.5 per cent. From these figures it is at once evident that *the period of gestation is very much less variable, in normal females, than the weight of the infant which is delivered.* This means that subnormally developed infants are delivered relatively earlier and supernormally developed infants relatively later than their stage of development would warrant were the length of the period of gestation determined primarily, or to any great extent, by the stage of development attained by the fetus. We must conclude, therefore, that the length of the period of gestation in normal females is primarily determined, not by the fetal development, but *by a maternal cycle of events* which is to a considerable extent independent of the stage of development attained by the fetus.

SUMMARY.

From a statistical investigation of 511 normal confinements of South Australian females, comprising 247 confinements yielding

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* Since 68.27 per cent. of the area of the probability curve lies between the abscissæ of the points of inflexion.

male infants and 264 confinements yielding female infants, it is concluded:

(1) That the mean length of periods of gestation yielding males is 282.5 days with a probable error of ±0.55 days and a variability of 4.47 per cent.

(2) The mean length of periods of gestation yielding females is 284.5 days with a probable error of ± 0.57 days and a variability of 4.85 per cent.

(3) The probability of the truth of the conclusion, based upon the above estimates, that the periods of gestation yielding females are longer than those yielding males is 142 to 1.

(4) There is only *one* period, the "normal" period at which the percentage of infants delivered by normal mothers attains a maximum. Subsequently to a very early period in the development of the fetus, there is no evidence of a "critical period" in the intrauterine growth of man such as occurs in the intrauterine growth of guinea-pigs.

(5) The deviation of normal periods of gestation from the mean are fortuitous in origin.

(6) The chances are a million to one against a male child being delivered at the termination of an otherwise normal pregnancy before 224 days or of a female child before 222 days after the onset of the last menstruation. Hence all seven-month children (210 days) may legitimately be regarded as the fruit of pathological pregnancies.

(7) The length of the period of gestation is very much less variable in normal females, than the weight of the infant which is delivered. From this fact it is inferred that the length of the period of gestation in normal females is primarily determined, not by the fetal development, but by a maternal cycle of events which is to a considerable extent independent of the stage of development attained by the fetus.

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PROLAPSUS OF THE UTERUS.*

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THERE are no interventions in surgical gynecology about which there is more diversity of opinion than those which are recommended for complete prolapsus or partial prolapsus of the uterus. Only in complete prolapsus of the uterus and vagina, have we an operation which permits us to guarantee a cure and, unfortunately, its application is limited to a small class of patients.

While we may give relief to a greater or less degree in cases of partial prolapsus, with or without retroversion, or retroflexio-versio, by means of mechanical supporters, yet I have failed to see a single instance of well-marked descensus or prolapsus where, by such devices, a complete cure has been effected. A resort to surgery becomes, therefore, a necessity. Such operations we may, for the sake of brevity, call orthopedic operations.

The term descensus I would limit to instances in which the uterus descends in a moderate degree from its normal place in the pelvis. Prolapsus, however, should be used to designate instances in which the entire organ, or a part of it, protrudes from the vulva. Total prolapsus I would confine to cases in which the protrusion involves the entire uterus and vagina. In most instances, so far as my personal observation goes, partial prolapsus has a vaginal protrusion proportionate to the degree of uterine prolapsus. Of course, exceptions occur, so that we may have a total vaginal prolapsus with

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a partial uterine prolapsus, and a total uterine prolapsus with a partial vaginal prolapsus.

When a woman with a total prolapsus of the uterus and vagina is kept in bed a few days, the uterus, having previously been reduced, does not again protrude for some time after her getting out of bed. Thus patients who are not compelled to be on their feet a great deal may be kept comparatively comfortable by the use of mechanical means and avoidance of physical exertion. A marked descensus uteri is, as a rule, accompanied by prolapsus to a greater or less degree of the vagina, particularly the anterior vaginal wall, and such vaginal prolapsus must be regarded as a preliminary stage of the uterine prolapsus. In such cases the two conditions should not be considered separately, but be included under the general term: "Uterine Prolapsus"—especially if the parts protrude from the vulva.

The prolapsus of the anterior, or posterior vaginal wall, or both, does not, however, preclude the practically normal position of the uterus, as is known to all who have seen a large number of gynecological patients. One of the etiological factors for the descent of the anterior vaginal wall is a nonhealed vaginoperineal laceration which causes a gaping of the vulva. This brings about destruction of the support of the anterior vaginal wall, and hence the internal abdominal pressure produces, in many instances, in the course of time, a descent of the anterior vaginal wall itself.

The prolapsus of the posterior wall, independent of uterine prolapsus, is readily explained by a nonhealed vaginoperineal tear which has extended laterally beneath and to the side of the column rugarum. This causes a gaping vulva and a destruction of the support of the anterior vaginal wall, as well as some loosening of the perivaginal tissue. Thus the edges of the vaginal mucosa, immediately, or soon after the injury, become attached and heal into a pathological site. Retraction of the scar in a sagittal direction then increases the descent. In other instances of prolapsus in which there has been no injury to the soft parts, as, for example, in virgins, we must consider a congenital malposition, such as the low position of the culdesac of Douglas and the vesicouterine space. Here the uterus gradually sags down and slowly inverts the vagina from above downward.

Relation of Other Pelvic Organs in Instances of Prolapsus.—When one does a vaginal hysterectomy or any other surgical intervention which necessitates separation of the bladder from the cervix, it must be obvious that, in cases of marked prolapsus the bladder too must be displaced, since the connective tissue between the bladder and the cervix—save in very exceptional instances—is quite firm, and therefore does not readily give way itself. Therefore it follows that the bladder descends with the cervix, and in this way forms a cystocele. Consequently, it follows that, in marked instances of this kind, we may have residual urine after the act of voluntary micturition has been completed. But it is not only the bladder which descends. In marked instances the urethra also becomes dislocated at its bladder end. A similar dislocation takes place of the anterior rectal wall forming a rectocele, which has, however, as the underlying cause an injury of the soft parts during parturition. Whether the adnexæ become displaced in injuries accompanying uterine descent depends upon the position of the uterine body. If there be but a moderate descent of the uterine body and principally an elongation of the cervix, the adnexæ are not likely to become displaced downward at all; but, necessarily, if the uterine body also descends markedly, the adnexæ (tubes and ovaries) must likewise follow the body to a greater or less extent. In instances of very marked uterine prolapse with descent of the entire vagina, the entire pelvic floor becomes so relaxed that it is evident that it can offer no support for the pelvic organs.

Etiology.—If we take a number of women who have sustained no injury to the soft parts during their confinement and let them get up very soon afterward—say the second or third day—and compare them with an equal number of women who have been confined in bed for ten days or more, under similar circumstances, and then examine them after the expiration of ten days postpartum, we will find that the uterus of the women who have been allowed to get up early has been reduced nearer to its normal size than those who were compelled to remain in bed. So that it must be obvious to the observer that the old theory of too early getting up has no marked bearing as an etiological factor on prolapsus or descensus of the uterus. The normal position of the uterus is one of physiological anteversio-flexio, and this position is more marked in the erect position of the patient than when such patient is lying upon her back. The erect position thus is more protection for the retaining of the uterus in the physiological anteversio-flexio aided by the intra-abdominal pressure than is the horizontal position. It is indeed impossible for a uterus that is in normal anteversio-flexio to sink downward so as to leave the vagina. For this to occur it must first assume a position in which its axis has about the same direction as the vagina. In other words, it must first be in a position of retroversion, or retroversio-flexio. Hence the deduction that the preliminary stage of prolapsus of the uterus is a retroversio-flexio in association with a relaxation of the supporting structures. Conceding that there is a relaxation of the supporting structures—that is, the bases of the broad ligaments, the rectouterine ligaments, the round ligaments, and the pelvic floor muscles—with the uterus in a position of retroversio-flexio, it becomes intelligible that, with the patient in an erect position—with the intraabdominal pressure upon the anterior surface of the fundus—and undergoing physical exertion, there is a tendency for the uterus to sink lower into the pelvis—into the vagina. It must not be thought, however, that we may not have a prolapsus of the anterior vaginal wall without a prolapsus of the uterus. Indeed, I have seen quite a number of such instances. We may have extensive defects of the pelvic floor without cystocele and without descent of the anterior vaginal wall, and we may also have instances of descent of the uterus without the presence of cystocele, particularly in virgins.

Treatment.—To say that it is imperative to treat all instances of procidentia or descensus of the uterus by surgical means is to voice a misconception. There is a large contingent of patients that may be treated by other means than surgery. A small number may be successfully treated by the method of Thure Brandt—namely, massage and Swedish movements—and some patients may be treated with good symptomatic results by means of pessaries.

Before considering the various surgical interventions for the cure of descensus and prolapsus uteri, permit me to give as my opinion that no surgical intervention has been devised devoid of some benefit, for a time at least. On the other hand, there is none in which failure may not sometimes occur. Were this latter not so, we should have no occasion to devise new interventions. Before deciding on a particular operation, it is well to consider whether future offspring is desired by the patient or not. From my point of view, it is perfectly justifiable to give the patient an opportunity to express her wish in that respect, and for us to consider, in connection with such wish, the justifiability of granting it. Certainly the patient should have a voice in this matter.

In reading the report of the ultimate result of any particular operation, it is necessary for us to be placed in possession of more detail as to what the condition was prior to the operation. The mere report, "descensus," or "prolapsus," is entirely insufficient as a basis of judgment, since I, personally, have known a number of instances called "prolapsus" by the operator, and for whom a prolapsus operation was done, when there was present only a moderate degree of descensus; and of course in such instances an absolutely good anatomical result may be expected from one of the more radical operations. At the outset I would say that a simple vaginal hysterectomy for prolapsus of the uterus should have no place in our domain of work, since by it a vaginal descensus cannot be cured. I affirm this with positiveness, because I have been called upon to operate in a number of instances where a vaginal operation had previously been done, and the patient was, if anything, in a worse condition than prior to the operation.

Since the greater number of patients who have had a descensus or prolapsus for any length of time have, as a result of a circulatory disturbance, a more or less marked degree of endometritis, a thorough curetting should be the first consideration.

When the woman is young and still has a desire for more offspring, with the uterus in a retroversio-flexio position, and—say, not more than the second degree of descensus, so that perhaps the cervix comes down nearly to the vulva, then I know of no surgical intervention which answers an equally good purpose as a ventral suspension by the round ligament a là Gilliam, combined with a plastic operation upon the pelvic floor, but not with too much narrowing of the vaginal canal. In doing the ventral suspension, one should make the uterine attachment as high up as possible—as high as the vagina will allow the uterus to be brought upward. Extensive cervical tears should be repaired, but in my opinion the amputation of the cervix, in such patients should not be done. If there has been trouble from a marked cystocele, the bladder should be displaced into the peritoneal cavity; but if a cystocele has not been present to any degree then an anterior colporrhaphy usually suffices. Taking for granted that this operation is employed for properly selected patients, rest assured that unless a subsequent pregnancy should undo the result of the operation, 90 per cent. of permanent cures will result. I have spoken against the amputation of the cervix because even a large voluminous vaginal portion of the cervix may be reduced readily provided the patient is kept in bed a week or two prior to operation and glycerin tampons are used. It is remarkable how a cervix will reduce itself in size under such treatment. Moreover, the cervix is, in my opinion, necessary for the well-being of a patient during a subsequent pregnancy, and consequent delivery at term. Only in exceptional instances, when we have an unusually long portion of the cervix may this, in part, be amputated. The shortening of the round ligaments by the inguinal canal, or the Alexander operation as it is usually called, I have found entirely inadequate to overcome a descensus of the uterus. That should only be employed when we have a free mobile retroversio-flexio without any marked descent of the organ.

Treatment of Marked Descensus, Partial Prolapsus and Complete Prolapsus, in Instances of Patients of whom no Further Offspring is Expected.—In such patients one is justified in doing what may be called a radical operation to overcome the displacement; and it is in this class of patients that one may rely entirely upon a vaginal operation to overcome the displacement of the uterus and vagina, as well as any existing cystocele and rectocele. One must judge whether a simple amputation of the vaginal part of the cervix, or a high amputation of the cervix is the better plan of procedure to undertake in the beginning of the surgical intervention. Personally, in the majority of instances, I prefer a high amputation of the cervix. To illustrate the procedure which I employ, and which is known under several names, as for example, the Watkins operation, the Schauta-Werthein operation, and the Duehrssen operation, but which I would call the radical vaginal fixation. Let me describe a hypothetical case:

The uterus large, perhaps one-third larger than normal; retroflexion with version, portiovaginalis coming down to the vulva outlet; a well-marked descensus of the anterior and posterior vaginal wall with recto- and cystocele, portiovaginalis large and edematous. My first step is to make a transverse incision over the anterior vaginal wall at its attachment to the cervix; next, a longitudinal incision from a little below the meatus downward to meet the transverse incision. Now the vaginal mucous membrane is dissected off on either side from the bladder a sufficient distance to free *entirely* the lateral parts; then the bladder is separated from the cervix and pushed upward into the peritoneal cavity, as soon as the vesicouterine peritoneum has been opened. The uterus is brought out into view with bullet forceps and if the patient is still during the child-bearing age, she is sterilized by exsection of the Fallopian tubes with part of the cornua of the uterus. A sufficiently large wedge of the uterine body is now exsected, and the wound brought together with two layers of sutures. The first stitch of heavy chromicized catgut is placed a trifle beneath the meatus of the urethra and united to the extreme upper part of the anterior surface of the fundus to hold the bladder intraperitoneally, while the rest of the operation is proceeded with. Before doing the high amputation of the cervix a suture is passed on either side of the cervix, rather high up so as to control the bleeding. The cervix is now liberated and amputated at the desired height by a circular incision, without too much blood soiling the field of operation. The raw surface of the amputated cervix is covered with vaginal mucosa in the customary manner. As much of the vaginal wall is now resected as may be necessary to make a snug enclosure. The vaginal fixation proper is now made by passing chromicized catgut sutures about 1/2 inch from the edge of the vaginal mucous membrane, through the anterior surface of the fundus and bringing them out on the opposite side. Usually three or four sutures are necessary to bring a sufficiently large surface of the uterus in contact with the vagina. Further sutures that may be required to close the vaginal mucosa are now placed. The uterus is then replaced high up in the pelvic cavity and the pelvic floor repaired. Taking for granted that this latter part of the operation is done in the manner now usually advocated, the result is, as a rule, very satisfactory.

We now come to the last class of patients: those who have a complete procidentia of the uterus and vagina, and in which no further use of the vaginal canal is to be made—that is to say, very old women, or widows who do not expect to marry again. It is in this class of patients that the most satisfactory results are obtained by a radical operation—a complete extirpation of the vagina with uterus. And the operation is comparatively simple. The vaginal part of the cervix is grasped with a pair of traction forceps, and traction made upon the uterus and vagina, so that the structures (uterus and vagina) are held taut, externally to the vulva. A circular incision is made through the entire thickness of the vagina, just inside of the vulva, and then the vaginal tube is stripped down all the way to the vaginal part of the cervix, avoiding injury of the other structures. Bleeding vessels are ligated with a very thin iodine catgut. I prefer a No. 0 or No. 00 plain gut, or iodine gut, for this purpose. Now the uterus is removed as in an ordinary vaginal hysterectomy. The removal of the adnexa is a matter of indifference. If diseased, the adnexa are removed; if not, they are left. Before cutting through the infundibulopelvic ligaments, a clamp is placed upon them, to act as a guide where to place the first suture. The vagina and uterus are now cut away in one piece. The first suture of chromic gut brings together the infundibulopelvic ligaments, and the ligature is left long so as to act as a guide while passing the second suture. The second, a circular suture of chromicized gut, is passed about 1½ to 2 cm. beneath the first but before drawing it taut, so as to make it obliterate the upper part, a pair of forceps is placed near the knot of the first suture and this cut off short; and, while an assistant pushes up the forceps so as to bury the infundibulopelvic ligaments high up in the pelvis, the second suture is drawn taut and tied. All remaining sutures are passed in a similar manner all the way down to the vulva, always pushing up the first section of the previous canal so as to give a firm columnization, as was the case with the infundibulopelvic ligament suture. The orifice of the vulva is now closed by a continuous suture. The subsequent treatment is very simple. If necessary the patient is catheterized, which may be necessary for the first two or three days, but otherwise no restrictions whatever are put upon the patient. I allow them to get up just as soon as they feel inclined to do so. Since the late Dr. George M. Edebohls called attention to this method of operating for complete procidentia, I have had occasion to do the operation twelve times and in every instance the result has been absolutely satisfactory. In one instance, the patient being only forty-nine years old and her husband only two or three years older, although perfectly willing to forego future marital relations, I decided to extirpate only the upper part of the vagina leaving a short vagina still remaining for other purposes.

On the remaining part I did a posterior colporrhaphy, and built up the pelvic floor as one does in plastic pelvic floor operations; and in this instance the result, too, has been satisfactory. My conclusion is that in a properly selected case, there is no operation that can possibly equal this one for permanent results. The operation done by the Drs. Mayo, of Rochester, Minn., is undoubtedly one of exceptional promise compared to some other operations; but I do not believe that it is superior to the operation that has been described in the foregoing.

39 East Sixty-first Street.

REPORT ON A SERIES OF PLACENTA PREVIA CASES.*

BY

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There appears to be a growing tendency to condemn the treatment of placenta previa by gauze packing, the use of bags and Cesarean section being preferred by most recent writers.

MacDonald, in his recent article reviewing 8625 cases of placenta previa in the *Journal for Surgery, Gynecology and Obstetrics*, June, 1911, gives Jewett's and Holmes' collection of 125 cases treated by Cesarean section with a maternal mortality of 13.6 per cent., and a fetal mortality of 49 per cent., approximately. He concludes his article by saying that gauze packing is a makeshift at best, often does not control hemorrhage, separates the placenta, and endangers the woman from sepsis.

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* Read at a Meeting of the New York Obstetrical Society, February 9, 1915.

Foulkrod, in the AMERICAN JOURNAL OF OBSTETRICS, vol. lxvii, reports ninety-five cases treated by Cesarean section, with a maternal mortality of 11.5 per cent. and a fetal mortality of 34 per cent. In 2010 cases treated otherwise, he gives a maternal mortality of 10.9 per cent. and a fetal mortality of 57 per cent. He also favors Cesarean.

Rheinhardt in the *Zentralblatt für Gynaecologie*, Leipsig, 1914, vol. xxxviii, also condemns the gauze tamponage for exactly the same reasons given by MacDonald and reports Doederlein as having lost 25 per cent. of his tampon cases.

It is quite interesting to read of the different receptions given Cesarean section treatment for placenta previa by the American Gynecological and Obstetrical Society in 1901 and 1911. Zinke's paper in 1901 certainly had a very cold reception, but in 1911, when the subject was again discussed by this society, it found many more advocates for Cesarean section as a conservative treatment in placenta previa, especially of the central variety.

That five cases of central placenta previa should have occurred on Dr. Flint's service in Bellevue Hospital within twelve months, and that the staff should have chosen the rather discredited method of gauze packing in the treatment of these cases, seemed to be of enough interest to take up a few minutes of the Society's time, in spite of the voluminous literature on this subject during recent years.

The first case, Mrs. M. J., aged twenty-eight, Italy, para-iii, thirty-six weeks pregnant, was admitted March 17, 1914, with profuse bleeding. Temperature 98, pulse 112; two fingers' dilatation. Under ether anesthesia, the house surgeon packed the lower uterine segment below the placenta, and packed the vagina tightly and applied a tight T-binder. The woman was given morphine, and a Murphy drip instituted. Bleeding was completely controlled, the woman rested quietly, but had some uterine contractions. In ten hours the gauze was soaked with blood, and again under ether anesthesia, the gauze was removed, the cervix found fully dilated, and it was possible to separate the anterior border of the placenta, rupture the membranes, and do an internal podalic version and breech extraction, with practically no further loss of blood. An intrauterine douche of 50 per cent. alcohol was given, and the uterus and vagina tightly packed with iodoform gauze. A living child, weighing 7 pounds, 12 ounces, was obtained, but the child developed convulsions at the end of forty-eight hours and died. The vaginal gauze was removed at the end of forty-eight hours and the uterine gauze was taken out on the fifth day, returning clean. Patient made an uneventful recovery, though the temperature at one time reached 101. She was discharged on the sixteenth day postpartum.

CASE II.—Mrs. S. P., Italy, aged thirty-one, para-viii, pregnant thirty-six weeks. Was admitted March 4, 1914, two fingers' dilatation. Treated in exactly the same manner as in the first case, an easy version being done about six hours after packing, through a cervix practically fully dilated. Stillborn child. Ran no temperature, and was discharged on the fourteenth day.

Case III.—Mrs. P. S., Austria, aged twenty-eight, para-ii, pregnant thirty-three weeks. Was admitted January 4, 1915. Had a profuse hemorrhage for twelve hours before admission, and was bleeding freely when she entered, with three fingers' dilatation. She was packed as above and infused. After four hours, bleeding appeared through the gauze, and on removal four fingers' dilatation found. It was necessary to go through the placenta, as we could not reach the anterior border. A living child weighing 4 pounds was obtained. The child died suddenly on the third day. The patient had to be infused immediately after delivery, a total of 880 c.c. of blood from her brothers were injected into her veins with a Lindemann needle, on the third and sixth day postpartum. The urine in this case showed albumin and casts from the first. Patient became edematous on the fifth day postpartum and only passed 5 to 8 ounces of urine during twenty-four hours, in spite of active treatment. She died on the ninth day postpartum in uremic coma. The highest temperature reached was 100.

Case IV.—Mrs. J. T., Italy, aged thirty-two, para-v, pregnant thirty-six weeks, admitted January 9, 1915; three fingers' dilatation on admission. Treated as in Case I. Bleeding was noticed through the packing after four hours and twenty-five minutes; nearly full dilatation found on removal of the gauze. Membranes were ruptured in front of placenta, and an easy version and breech delivery followed. Bilateral laceration of the cervix was sewn up and uterine packing removed on third day. Temperature reached 105 on the eighth day, but came down immediately, and she was discharged on the twenty-fifth day postpartum. She had had one previous hemorrhage three weeks before admission.

Case V.—Mrs. C. G., Austria, aged forty-two, para-xi. Admitted January 27, 1915, pregnant thirty-one weeks. Dilatation on admission four fingers, no bleeding at the time, but patient had had a sudden profuse hemorrhage just before admission. In this case Dr. Flint was able to do an immediate version and breech delivery. The uterine gauze in this case was removed at the end of forty-eight hours. She had a temperature up to 104 on the fourth day, but this came down by lysis, and the patient who is now in the hospital, is in good condition with a normal temperature and a pulse of 80. The child was born alive, but died almost immediately.

Of these five women, one died from uremic coma on the ninth day, and it is hardly fair to charge her death to her placenta previa. The others were all discharged in good condition. Of the babies, two were dead; one macerated; all were premature; two others dying within the first days, and only one lived any length of time. This one has since died.

Through the kindness of Drs. Edgar, Flint and Barrows, we are enabled to give the following figures from the Manhattan Maternity Hospital:

Total confinements	11,435
Total placenta previas	67
Of these,	
Central placenta previa	13
Babies died in first days	5
Babies stillborn	5

In the thirteen placenta previa cases in this series, gauze tamponade was used in the majority, though in some they finished the dilatation with Pomeroy bags, or manually. All were more than one finger dilated on admission. In one case the hemorrhage was not controlled, either with gauze or bag, and they had to do an accouchement forcè. Many of these cases were packed on the outdoor service, and the hemorrhage was not controlled, but when properly packed under an anesthetic in the hospital, the bleeding was checked for a considerable time, in two cases for more than twenty-four hours and in one for three days, before it became necessary to remove the gauze. All but one of their cases had four fingers' dilatation when the gauze was removed. One case died during delivery.

De Lee gives as conditions making Cesarean section advisable, a woman in good condition, at or near term, with a living child, the cervix closed or indicating difficulty in dilatation, with the proper surroundings. In none of these eighteen cases of central placenta previa were these requirements found.

Considering the condition of all of our patients when we first saw them, and from the history of the Manhattan Maternity Hospital cases, I believe we would have had a higher maternal mortality by doing an immediate section. After the Bellevue cases were once packed, there was practically no further loss of blood and they were all delivered so easily that there was very little shock.

In the eighteen cases the fetal mortality was tremendous; seven babies were dead on admission; ten died within a short time, and only three are reported as doing well. Since all the babies that were alive when the mother was admitted were born alive, and such a large number of these were premature, though it is true only from three to eight weeks, it is questionable whether we would have obtained a much lower fetal mortality by Cesarean.

The bag is certainly the method of choice in marginal and partial placenta previa where the membranes can be ruptured, so that the bag acts to hold the placenta against the side, and at the same time to dilate the cervix. I have had no experience with the bag in central placenta previa. The bag placed below the placenta seems to me to separate the placenta further, not to entirely fill the lower uterine segment, to have a tendency, with the smaller bags, to slip out and allow hemorrhage behind it. To place the bag above the placenta, when the placenta is directly over the os, thickened and bleeding, is not an easy matter in all cases, and hardly a method to be used by a frequently changing house staff, as we have at Bellevue, and it is the house staff who must control the hemorrhage in some manner until one of the attending staff can reach the hospital. The bag placed above the placenta, with a slight weight attached to the cord, certainly ought to control bleeding and also aid in the dilatation of the cervix.

From our experience in Bellevue, I would say that the hard, undilatable cervix in placenta previa is found more frequently in the marginal and partial varieties, and in the central variety the cervix, though friable and easy to tear with rough treatment, dilatation will occur under proper gauze packing and usually in a surprisingly short time. The proper packing of a case of placenta previa cannot be done without an anesthetic and is best done digitally. We recommend the iodoform gauze both before and after delivery, as it can be allowed to remain in the uterus a far longer time without the vaginal and uterine discharges becoming putrid. The danger of secondary hemorrhage, when the woman reacts from her loss of blood, is rendered less by leaving the gauze in even until the sixth day. We frequently have left the iodoform gauze in the uterus for six days, and upon removal still found it "sweet."

149 West Seventy-fourth Street.

VALUE OF MODERN FUNCTIONAL KIDNEY TESTS TO THE CLINICIAN.*

BY

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For many years it has been a constant effort of the clinician to devise a means to determine the functional ability of the kidneys. For this purpose it seemed most natural to turn to the daily excretion of solids in the urine as an index, and particularly to urea, chlorids and

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* Read at a meeting of the Alumni Society of the Sloane Hospital for Women, January 22, 1915.

phosphates, these being the predominant constituents. It was soon found that persons varied greatly as to the daily amount of these substances excreted, the difference depending not only on diet and mode of life, but also on body weight and unknown causes. Over thirty years ago Fleischer(1) compiled an elaborate report based on such observations, which was probably the first effort at the determination of renal function. Later Koranyi(2) supplemented this effort by determining the molecular concentration of the blood, and concluded that if this was increased the impairment in function of the kidneys was in direct proportion to such increase. These efforts were followed by the descriptions of a great variety of tests advocated by experimentors and clinicians all over the globe with the result that the medical journals have published a vast amount of material on the subject during the past ten years, which has left the clinician in more or less doubt concerning the utility of these functional tests.

The hope of the practitioner of medicine has been an evolution which would result in procedures for the determination of prognosis in renal disease, for the differentiation of the various types of renal disease and finally for the recognition of such slight changes in renal function which are not recognizable on examination of the patient or on the microscopic and chemical examination of the urine. The surgeon desires an additional procedure which will indicate the relative functional ability of each kidney in addition to the knowledge of the renal functional ability as a whole.

The problem of determining renal functional ability is at best a complex one and no single, simple test can be expected to solve it. It must not be forgotten that the function of the renal parenchyma is greatly influenced by the cardiac condition, by the blood pressure and by the condition of the blood-vessels. Consequently the faults indicated by the usual functional kidney tests may be referable solely to the diseased renal parenchyma or may as well be due to contributing disease in the cardiovascular system with less marked actual renal lesion. In other words, cases of relatively slight nephritis with cardiovascular disease may show much greater evidences of faulty renal function in the tests than others in which the anatomical lesion of the kidney is much more pronounced. For these same reasons it is easily seen how difficult it may be to draw prognostic conclusions from functional renal tests, in fact how impossible the feat unless these conclusions are also based on an accurate knowledge of all factors, a by no means easy task in a relatively large number of instances. The complexity of the problem becomes apparent when the claims of the different authors on the subject are read and it becomes even more so when the attempt is made to apply any one test in practice with the hope that it will answer all purposes. Not one of the tests in prolonged practical experience will be found to justify a definite opinion in every case and we have as yet no hard and fast combination of tests which will do this. On the other hand, there is no doubt that a combination of tests will give important prognostic information in many instances, that they are often of material aid in the differential diagnosis between the different types of nephritis and that occasionally a diagnosis of nephritis is made thereby before definite signs of the disease become apparent. The combination of tests necessary for these purposes is not an arbitrary one, but must be made to suit each particular case to be studied, and the proper selection of the tests and the interpretation of results demands an accurate knowledge of the clinical condition of the patient. The claims occasionally made that functional kidney tests are of no value whatever will usually be found based on the arbitrary use of a single method without attention to accurate clinical diagnosis and without effort to explain apparent discrepancies. For example, passive congestion of the kidney will show much lower renal functional ability than the same kidney under normal conditions of the circulation, and it is this fact which has been so frequently overlooked by those who condemn these tests. The gravid uterus and large abdominal tumors are causes of passive renal hyperemia by interference with return circulation. In these cases there are many records of the deficient excretion of solids, of an increased molecular concentration of the blood, and of a deficient phenolsulphonephthalein excretion on test as shown by Harvey(3). This is doubtless the reason why Borchardt(4) states that the phthalein test does not seem applicable to pregnant women, positive findings having been reported in apparently normal persons giving a constantly negative response to other tests. This is exactly what was noted in the few trials with the test in normal pregnancy by Harvey and myself quoted above.

It would, of course, be impossible to consider all the tests advocated and brief mention only will be made of those considered most practical at the present time. It is convenient to divide them into two general classes:

First.—Those tests which are used to indicate prognosis in renal disease, namely, the phenolsulphonephthalein test, and the amount of incoagulable nitrogen in the blood.

Second.—Those tests which are intended for the early diagnosis of abnormal renal function and for the differentiation of the various types of nephritis, namely, the ability to excrete water, sodium chlorid, lactose, and iodid of potash.

The phenolsulphonephthalein test was introduced by Geraghty and Rowntree(5) and to a great extent superseded the other tests of this class as an indicator of renal functional ability. The technic is very simple and as follows: 300 to 400 c.c. of water are given one-half hour before the test is made to insure free urinary secretion. After the lapse of the half hour as stated the bladder is completely emptied and, noting the time, 6 milligrams of the drug are given subcutaneously or preferably intervenously. All urine secreted during the first two hours is collected and the contained phthalein estimated colorimetrically by a very simple and accurate method. The average excretion from normal persons in two hours is from 60 to 85 per cent. of the amount administered. A large number of published reports agree with those of the originators in the statement that the decreased excretion of the drug is in direct ratio to the severity of the renal insufficiency but that disturbed function of the cardiovascular system with passive congestion of the kidneys show tests indicating decidedly lowered functional ability of the kidney in the absence of any true renal lesion. As it is oftentimes difficult and sometimes impossible to decide to what extent cardiovascular fault influences the condition the deficiency of this test becomes apparent. This for example makes the test by itself quite useless in pregnancy and other conditions accompanied by passive renal hyperemia.

The accurate determination of the amount of incoagulable nitrogen in the blood with the use of relatively little blood has recently been made possible by the colorimetric method devised by Folin and Dennis(6). This is by no means as simple a test as the foregoing and requires care and experience if accurate results are to be obtained. The average excretion by normal persons is variously stated by different investigators using the method advocated and ranges between 22 and 40 milligrams in 100 c.c. of blood. Here again, the increased amount of incoagulable nitrogen in the blood is usually in direct ratio to the severity of the renal lesion. It has been shown, however, by Agnew(7) and others that the cases of cardiovascular lesion and passive renal congestion show no abnormal amount of incoagulable nitrogen in the blood and consequently this test combined with the phthalein test would seem to constitute as good a method as we have to determine prognosis, not only in renal disease but also in combined cardiovascular and renal cases. The detailed accounts of cases published by Agnew as mentioned above are particularly instructive in this connection and it is this combination which has been found of special use in determining renal function in pregnancy when there is a coexisting passive congestion of the kidney.

Schlayer(8) and his followers have attempted to determine separately the function of the vascular or glomerular and the tubular apparatus of the kidney with the idea of differential diagnosis. They claim that disease of the glomerular apparatus interferes with the excretion of water and lactose and disease of tubular apparatus interferes with the excretion of sodium chlorid and iodid of potash. These tests are not difficult. The water test consists of an intake of about 1 liter, preferably early in the morning, in the form of weak tea, which is usually excreted in large part by normal kidneys within four hours. In diseased kidneys of the vascular type this water excretion is either deficient or abnormally great indicating either inefficiency or abnormal sensitiveness of the glomerular apparatus, which is confirmed by the delayed excretion of lactose in both.

The lactose test consists of the intravenous introduction of 2 grams of lactose of which 60 to 80 per cent. is recovered in the urine of normal persons within four hours, while in cases of vascular nephritis this excretion is delayed from eight to twelve hours.

The sodium chlorid test consists of taking 10 grams in capsules by mouth which is excreted within twenty-four hours by normal persons, while in tubular nephritis this excretion is delayed from eighty to 100 hours. In serious cases this test is not devoid of danger.

The iodid of potash test consists of the administration of 0.5 gram, which in normal persons is excreted in forty hours, while in cases of tubular nephritis the excretion is delayed for eighty to 100 hours. By using these tests Schlayer claims the ability to distinguish the different types of acute and chronic nephritis. Acute or chronic vascular nephritis showing increased or diminished water excretion and delayed lactose excretion with normal chlorid and iodid excretion. Tubular nephritis showing delayed chlorid and iodid excretion with normal water and lactose excretion. Mixed cases frequently occur which will show different combinations of these reactions. Schlayer also claims to be able to determine slight functional faults by these means before clinical signs of a renal lesion are apparent.

While these methods for the differential diagnosis of the different types of nephritis are certainly ingenious and doubtless of use in many instances, the results obtained are often conflicting and, while we must admire the progress made, the last word has by no means been spoken. While Schlayer's classification of nephritis into the vascular and the tubular variety has many anatomical and clinical points in its favor, and is appealing in its simplicity, there are also reasons why many do not feel justified in abandoning our older classification, and for this reason one cannot help but feel that something still better may be devised. Refinements in diagnosis, such as have just been considered, in no way replace our older clinical and laboratory methods of diagnosis of renal and cardiovascular disease; they are simply further aids, helpful in some instances, but confusing and probably inaccurate in others. The increasing tendency of some clinicians to rely exclusively on relatively untried modern laboratory methods of diagnosis at the expense of careful bedside observation is unfortunate, in that it is apt to discredit the laboratory worker anxious to render every possible aid. The fact remains that the careful bedside worker who least needs laboratory aid in diagnosis is the very one who gets the most help from it for he learns to appreciate its limitations as well as its value.

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200 West Fifty-sixth Street.

OBSERVATIONS ON TWO HUNDRED TWENTY-SEVEN CASES OF ECTOPIC PREGNANCY.*

BY

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I am not unmindful of the honor conferred upon me by your invitation to speak to an audience containing so many men who have contributed so much to the advances in obstetrics and gynecology, nor do I feel quite sure that I am bringing to you anything of value.

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* Read at a meeting of the Alumni Society of the Sloane Hospital for Women, January 22, 1915.

Yet all of us, as a result of our individual experiences, formulate definite views as to certain conditions and their management, and it is to present some of these conclusions that I am going to take your time to-night.

Since 1900, 227 cases of ectopic pregnancy have been operated upon in my several hospital services. There have been four deaths. Three of these fatalities were due to septic peritonitis and one was from hemorrhage. In this case there was an intraligamentous rupture of a pregnancy in the isthmic portion of the tube, the ovum continued its intraligamentous growth for several weeks, eroding itself into the uterine artery. A vaginal incision was made and death occurred on the table from hemorrhage before the abdomen could be opened and the bleeding checked.

The patients making up this series may be classified into those presenting symptoms of the *nontragic* and those of the *tragic* stage. All, save one, occurred before the third month of pregnancy. This exception was an interstitial gestation. Forty-three had been curetted for uterine hemorrhage one or more times before admission to the hospital.

From an analysis of these cases we are forced to the conclusion that properly diagnosticated ectopics should never reach the tragic stage, for there is no question that an early diagnosis is possible in a great majority of instances. It is superfluous to discuss the diagnosis in such a company as this, except to call attention to the fact that our students, on going out, miss the diagnosis in these cases in the nontragic stage simply because the picture of ectopic as it occurs, and ectopic of the books, are different things. They are all familiar with the clinical picture of rupture and internal hemorrhage, but our experience shows that this classical description is the exception rather than the rule. On the other hand, the large majority of these patients in the nontragic stage, that is, before actual rupture has taken place, give a picture so typical that any tyro should be able to make a presumptive diagnosis.

The histories of these cases show that ectopics occur in three classes of women: first, those where pregnancy has been preceded by a varying period of sterility, in a woman who has been previously the subject of a dysmennorrhea, due to congenital uterine anomaly, with no history of infection; second, in women in whom the tubal lumen has been disturbed by a previous infective process, giving a history since marriage of chronic pelvic inflammatory trouble; and third, in women who are subjects of rapidly recurring and repeated pregnancies, as may be found among our foreign population, particularly the Jews, Italians and Irish. The largest number of my cases fall within the last two classes. This observation has a significance etiologically as it has a bearing on what shall be done with the other tube at the time of operation.

Two hundred and twenty-two of these women presented some menstrual anomaly, as a period of amenorrhea, prolongation of the normal period, anomalous character of the bloody discharge, or an anticipated period followed by an intermittent or continuous metrorrhagia. This vaginal discharge, which is irregular in occurrence and amount, has presented definite characteristics, it is brownish red blood, mixed with mucus, which does not clot, its quantity is increased from time to time, coincident with the painful paroxysms

Pelvic pain was absent in only one patient. The pregnant ovum, located outside of the uterus, is in a more or less continual state of unrest, for the ovum either imbeds itself in the plications of the tubal mucous membrane, where it burrows beneath the mucosa, or imbeds itself directly in the muscular tissue of the tubal wall. The muscle cells are destroyed by the eroding action of the trophoblast, which allows the ovum to become intramuscular. The blood-vessels are also invaded by the cells of the trophoblast and extravasation of blood takes place between the ovum and its seat, and passes through the porous and stretched tubal wall or escapes into the lumen of the tube, to leak from the fimbriated extremity into the culdesac and form a hematocele. This extravasation from the capillaries rapidly distends the tube and occasions paroxysms of pelvic pain, sharp, knife-like in character, slight or severe, but almost always present. Abdominal soreness from distention of the tube, and peritoneal irritation occasioned by extravasation of blood is usually complained of. The peritoneal irritation produced by the entrance of blood into the peritoneal sac, even before rupture, explains the exquisite pain which may be elicited on movement of the cervix by vaginal touch. The attacks of pain may be general, abdominal colic, or sharp, colicky pains, referred to the region of the fruit sac, followed by intervals, of hours or days, of complete remission. Abdominal sensitiveness following the paroxysms of pain has been noted in every one of the cases observed. An analysis of these histories shows that metrorrhagia or menstrual anomalies with pain were constantly present in over 98 per cent. of our cases before final rupture, hence, we feel that with certain pelvic signs, which are always more or less available, to establish the presence or absence of a pregnancy, that it is possible for a diagnosis to be made. The signs we refer to are: the dusky hue of the cervix, the slight softening of the cervix, and the enlargement of the uterus without any of the characteristic changes in shape and consistency found in normal pregnancy. A mass or tumor was present in every instance. It was found either on one or the other side or in front or behind the uterus, always displacing it to some degree. This mass had more or less definite characteristics. It was tense, tender, and the pulsation of the uterine artery on the side corresponding to the mass was always more marked.

It must be remembered that there are usually numerous minute ruptures with some leakage of blood into the peritoneal sac occurring before the final break takes place. This, I think, has been proven clinically, on opening the abdomen in unruptured cases and finding free blood in the cavity and eroded areas on the surface of the distended tube. Consequently both the patient and the practitioner have warnings before actual rupture takes place.

The signs of rupture are too well known to you all to burden you with their recital. The sudden attack of abdominal pain, faintness, shock, pulse changes, pallor, are classical, while the blood picture is progressive, showing an increasing anemia, with the leukocytosis of hemorrhage. Too little importance, however, has been placed on the blood pressure, which is always lowered in hemorrhage, and progressively diminishes as long as the hemorrhage continues, to the point where the hemorrhage ceases, as the result of blood clot. All of our cases in the tragic stage have shown a blood pressure of less than 100 mm., and many a pressure of only 80 mm.

This brings us to the question of when to operate in ectopic gestation. In unruptured cases the tube should be incised and the pregnancy evacuated or the tube extirpated as soon as the diagnosis is made. In the ruptured cases in the tragic stage presenting the symptoms of shock, it is our custom to postpone the operation until after reaction has taken place, keeping the patient under constant and intelligent observation. Our procedure has been as follows: On admission the patient is placed in the extreme Trendelenburg posture and her pulse carefully counted and recorded, her blood pressure is taken and recorded, she is then given a hypodermic of morphine, *without* atropine, of from one-quarter to three-eighths of a grain, which may be repeated on the first sign of restlessness. The pulse is taken and recorded every fifteen minutes, and the blood pressure recorded every hour. No saline and no stimulation are given. Under this plan, in the course of a few hours, apparent changes are noted. As a rule the pulse improves in quality, becomes slower in rate, and the blood pressure gradually rises. Water is given freely by the mouth, if not vomited. In this series of cases there has been none which have failed to improve under this form of watchful waiting. Repeated blood examinations to ascertain the hemoglobin percentage, and number of red cells, also helps to determine whether the bleeding is continuing or has ceased. When reaction has taken place, as is shown by a slowing of the pulse, the rate usually falling to below 120, an increase in its volume, and a rise of blood pressure to 115 mm. or more, we consider it time to operate. This should be done with as little disturbance as possible. Of late we have preceded the operation by the administration of one-quarter of a grain of morphia, in addition to what she has had, and have employed spinal anesthesia using 1½ grains of novocaine. When further anesthesia has been necessary ether and oxygen have been added. The skin preparation has been made upon the table with iodine, the abdomen rapidly opened and the offending tube sought, a clamp placed on the ovariopelvic ligament and on the tube at the uterine cornu, which usually controls the hemorrhage, and the tube is then removed, leaving as much mesosalpinx as possible. It is important in the removal of a tube not to interfere with the circulation of the ovary on that side by placing the ligature so as to include the vessels which pass through the ovarian ligament to the ovary. Many cystic ovaries have been produced by surgeons by interfering with this anastomosis. After the hemorrhage is controlled the large clots are removed, the other tube inspected, and if apparently normal, left in place, if diseased or injured during the manipulations, it is removed. A quart of normal saline solution is then left in the abdomen and the wound closed in layers, supported by retention sutures of silkworm-gut.

Some years ago we discontinued the use of saline infusions owing to the unfortunate results in service of one of my colleagues. He was so unfortunate as to lose three ectopic patients in succession from pulmonary edema in whom infusion had been employed immediately following operation. This so impressed us that we began to study the effects of infusion and overinfusion on our own cases, and we found that each case that was infused showed some dyspnea and definite terminal cyanosis. It is but reasonable to think that a heart which has adjusted itself to an empty blood stream is hardly competent to carry the amount of saline that is forced upon it by the energy of some operators. Nature seems competent to take what fluid it needs from the saline left in the abdomen, which mixes with the blood already there and is absorbed, or from the rectum by a Murphy drip, without embarrassing the cardiac function.

No drainage has been used except in infected hematocele. Three of these have been opened from below. So strongly do we feel that the employment of drainage is a disadvantage in the operative management of ectopic, that if the culdesac has been opened for diagnosis, as is frequently the case, we sew it up, in order to protect the pelvic blood clots from vaginal infection.

In this series there have been four interstitial ruptures, two ruptured pregnancies developing in the rudimentary horn of a bicornuate uterus, and eleven isthmic ruptures, three of these being into the broad ligament, forming a pelvic hematoma, and eight into the peritoneum, while 210 have been pregnancies in the free portion of the tube. In none were there any active bleeding vessels observed at the time of opening the abdomen, except in the case of intraligamentous rupture with erosion of the uterine artery, which was opened through the vagina, referred to earlier in this paper.

Another question which we have attempted to answer in this series is: What influence has curettage of the uterus in checking the uterine hemorrhage, which is so apt to continue for a long time after an ectopic pregnancy. To reach a conclusion we have done two things. We curetted a series of cases and at the same time noted if a corpus luteum cyst was present, and checked these cases with a series not curetted, also observing whether or no the corpus luteum cyst was present. From these observations we have concluded that curetting has no influence on the bleeding from the uterus which occurs after removal of an ectopic pregnancy, but that it is controlled wholly by the presence or absence of a corpus luteum cyst, for in the cases in which no cyst was found the bleeding promptly ceased.

These patients rapidly regenerate blood. In only seven was it necessary to transfuse the patient during convalescence. Five of these transfusions were done by the Linderman method, two by the direct method of artery to vein. Six women have been reoperated upon for ectopic on the opposite side. How many of the other discharged patients have fallen into the hands of other surgeons it is impossible to tell.

The conclusions which we come to from this study, incomplete and brief as it is, are as follows:

First.—That the symptoms and signs of ectopic are so constant, even before rupture, that an early diagnosis ought to be made in the nontragic stage.

Second.—That in the tragic stage, operation should be deferred until reaction; further, that careful observation should be made of the pulse and blood pressure, and that the blood pressure should not be permitted to rise to a point so high as to start up fresh bleeding. In other words, operation should be done during reaction before blood pressure has reached a point above 115 mm.

Third.—That examination under ether to confirm the diagnosis is always dangerous, as it is a potent cause of rerupture, or may even produce primary rupture.

Fourth.—That only large clots should be removed and a quart or more of saline be left in the peritoneal sac to mix with the fluid blood.

Fifth.—No saline is necessary by infusion as sufficient fluid can be introduced into the patient by saline in the abdomen by hypodermoclysis and with the Murphy drip.

Sixth.—That drainage is dangerous and is a cause of infection of blood clots.

Seventh.—That curettage does not control the postectopic bleeding, but that persistence of uterine bleeding is dependent upon the presence or absence of a corpus luteum cyst.

287 Clinton Avenue, Brooklyn.

REPORT ON A CASE OF URETERAL INJURY AND ITS TREATMENT.

BY

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Mrs. J. B., thirty-eight years of age, a West Indian, was admitted to the service of Dr. Polak at the Long Island College Hospital on August 1, 1914, complaining of pain in the lower abdomen and back, with menorrhagia, for the past twelve months. Her family and personal history were negative. She began to menstruate at the age of sixteen years, was of the twenty-eight-day type, four-day flow and no pain.

Her last period occurred on July 26, 1914. She was married in 1905, had one miscarriage in that same year and has not been pregnant since. In 1906 she was operated on twice for "leukorrhea and pains," and was told by her physician that she has some "growths" on the womb, although not significant enough to be removed. Present trouble dates back one year, the principal causes of complaint being pain in the back and lower abdomen, with tenesmus on the left side, increased menstrual flow, though the periods have been regular

Examination.—Chest and lungs negative. Heart sounds rather weak. Abdomen negative except for hypogastric scar about 4 inches long above pubes, and hard mass extending three finger breadths above pubes in median line, somewhat tender. Vagina: introitus intact, cervix posterior and pointing in the axis of the vagina. Anteriorly a mass the size of an orange, connected with the uterus. Uterine fundus pushed to the left and upward. Adnexa not palpable.

Diagnosis.—Uterine fibroid.

Operation.—Vertical incision in abdomen slightly to the left of the median line. Uterus found to be the seat of several fibroids, the largest one, the size of a small orange, being rather low on the anterior wall. There were a few adhesions between the uterus and the posterior pelvic wall. A subtotal hysterectomy was performed. During the course of the operation the left ureter was cut obliquely and almost severed about 1 inch from the bladder wall. Because of the location of the injury, it was thought best not to attempt an anastomosis of the ureteral ends, but rather to implant the proximal end into the bladder, which was done in the following manner. A uterine sound was passed through the urethra into the bladder as a guide, and an incision made through the bladder wall below the point of peritoneal attachment. The lower end of the ureter was tied off and the tip of the upper segment transfixed with a fine silk suture, threaded on both ends. Both needles were passed through the opening into the bladder, through the bladder wall from within outward and the suture tied after drawing the ureter down into position. The ureter was then sutured to the margin of the slit in the bladder, and the area covered by peritoneum in the usual manner after a small gauze drain had been passed through the posterior culdesac of the vagina to the point of anastomosis. The abdomen was closed and a self-retaining catheter inserted in the urethra.

The wound in the abdomen healed by primary union, there was no leakage of urine through the vagina, but a rather severe cystitis developed, and the convalescence was slow.

The bladder condition improved under treatment (instillations of 20 per cent. argyrol every third or fourth day) and a cystoscopic examination on September 27 showed the large round opening of the implanted ureter on the left side of the bladder about midway between the trigone and the summit of the fundus of the bladder, the original opening of the ureter small and round, and the right ureter opening normal.

The examination on discharge, made by Dr. Polak, gave the following findings: Abdominal wound healed by primary union. Normal pudendum. Vaginal examination: stump of cervix high and freely movable. No exudate palpable. No pelvic tenderness.

380 Vanderbilt Avenue.

TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

Meeting of January 7, 1915.

The President, GEORGE ERETY SHOEMAKER, M. D., *in the Chair.*

DR. GEORGE ERETY SHOEMAKER read the report of a case of

PERMANENT RECOVERY FROM ULCERATIVE CYSTITIS FOLLOWED BY NEPHRECTOMY FOR TUBERCULAR KIDNEY.

A few days ago there was an opportunity to cystoscope a bladder which was entirely normal in function and free from disease, in a patient whom I treated for severe ulcerative cystitis about nineteen years ago, and who later developed a tubercular pyonephrosis with multiple abscesses for which I did nephrectomy five years ago. As bearing on the behavior of such cases over long periods of years, the history was of some interest.

The original condition was most distressing. It had existed for several years in a multipara with cystocele and residual urine. Great pain was brought on by the attempt to urinate, followed by straining, intense desire to empty the viscus with the expulsion of a few drops at a time for an hour. This sequence occurred day and night at intervals of not more than two hours, until the patient was exhausted by sleeplessness and pain. She was reduced to 88 pounds in weight.

Examination showed extensive granulating surfaces at the base of the bladder both behind and in front of the internal urethral orifice. The granulations were soft, extremely sensitive and covered with incrustations and calcareous deposits on the pubic portion of the wall. There was no stone. Notwithstanding the wretched state of the patient, the bladder inflammation was not tubercular but was entirely cured by button-hole drainage closed by operation after nine weeks.

The treatment included irrigations and such uterine and bladder support as stopped the pocketing and prevented the collection of residual urine.

She regained her general health and remained entirely comfortable for eight years, giving birth normally to a child in the interval. In 1903, or eight years after cystotomy, bladder symptoms returned and gradually increased. Soreness gradually mounted upward along the ureter to the loin. In 1907 the patient returned to the city with large multiple abscesses in the left kidney and surrounding tissues. She was passing ounces of pus with the urine from this side, while the urine from the right side contained casts. Nephrotomy was done, at the Presbyterian Hospital in December, 1907, relieving the septic condition. Tissue removed from the kidney showed tuberculosis under the microscope. There were, however, no indications that the bladder was invaded by the bacillus. No excavated patches. No radiating lines of redness, though the ureteral openings were swollen and hyperemic. March, 1910, bladder well. General health greatly improved but sinus in back fills and empties occasionally, the pus having a fecal odor at times, but no intestinal contents escaping. No urine from left ureter and none from sinus in the back.

Operation.—Nephrectomy with excision of sinus, ureter cut off and dropped. Dead kidney; much firm inflammatory tissue surrounding the kidney. Dissection very difficult on account of induration of tissues close to great vessels. No silk ligatures used. Clamps left on stump, loosened in two days. Smooth recovery.

October, 1914, four and a half years later general health entirely restored. Gain of nearly 50 pounds in weight. A small sinus remains, however, which was treated with autogenous vaccine without result, and later by bismuth injections.

The bladder has been completely restored. Cystoscopy showed the scar of the old button-hole operation. Also two pale cicatrices from former ulcers. The ureteral orifices were free from inflammation. The casts had disappeared from the urine and there was no pus. In fact there was little except the cicatrices to show that the bladder had not always been normal.

In this connection, I saw, a few weeks ago, a patient from whom I removed in November, 1911, a kidney containing multiple tubercular abscesses. The ureter also was tubercular, stiffened and enlarged, completely impervious. It also was removed down to the bladder wall. (Reported, *Annals of Surgery*, 1911.)

This patient suffered severely at times with her bladder for more than a year after the nephrectomy, though the bladder showed no tubercular disease. There was a pure culture of the bacillus alkalinus in the kidney, at the time of operation. The urine had a tendency to become alkaline for a long time afterward, but the bladder is now entirely well. The patient is fat and strong and has recently been delivered of the second child born since nephrectomy.

DR. STEPHEN E. TRACY.—In operating for tuberculosis of the kidney a nephroureterectomy should be done. It adds but a few minutes to the time of operation. After the usual incision in the loin has been made, the kidney delivered, the vessels ligated, and the ureter has been separated as far down as the finger can reach, the patient is turned over. A muscle splitting incision is then made low down on the abdomen, and the ureter located. After this has been accomplished the ureter is stripped down to the side of the bladder, cut between ligatures and both ends cauterized with phenol. The divided ureter is then removed with the kidney through the incision in the loin. Should there be any difficulty in locating the ureter, traction on the kidney will make it stand out as a distinct cord. A certain number of ureters, in cases of tuberculosis of the renal system, are strictured, and such ureters must drain upward, which will mean a sinus in the wound for months, and in some cases years. A complete nephroureterectomy eliminates these sinuses and the wounds heal promptly. If the ureter be patulous the infection will drain into the bladder, which is not desirable. Therefore, I feel that with a patient in good condition, the infected ureter should be removed with the kidney.

Dr. Shoemaker, closing.—The removal of the ureter, which was done in one of these cases, and not in the other, is not always a simple matter, and many of the best surgeons avoid doing it, claiming results as good from the injection of carbolic acid. Some difference should be made according to the appearance of the ureter. It is sometimes obviously free from disease. In a bladder previously shown not to be tubercular, if the ureter is apparently normal, the lower end, it would seem, might be left with safety. If, however, it is infiltrated and thickened apparently by tuberculosis as it is in some of the cases, it is better out. In one of my cases there was so much surrounding induration as to make any such attempt foolhardy.

John A. McGlinn read a short paper on

AN EASY METHOD OF DIAGNOSING POSITIONS OF THE OCCIPUT. SOME FUNDAMENTAL ERRORS IN THE DELIVERY OF THE BREECH.

Occiput posterior positions occur so frequently and are associated with such serious results, at times, that it is desirable that we have an easy and accurate method of their diagnosis. Their recognition before labor is as a rule made without much difficulty in the majority of cases by an abdominal examination. After labor is well established it is well nigh impossible to make the diagnosis by such an examination and we are compelled to have reliance upon a vaginal examination. The text-books that I have consulted all advise the classical method of finding the sagittal suture, noting which oblique diameter it occupies and then find the anterior and posterior fontanelles. The large posterior fontanelle is always in relation to the cardinal point which determines the position. In practice I have always been impressed with the inadequacy of this method. If the labor is well advanced and the head engaged it is difficult to differentiate between the various sutures and to find, let alone recognize, the fontanelles. When the head is well engaged the bones of the fetal skull so overlap that the fontanelles are obliterated.

What I have to suggest is, I am sure, not new to any member of this Society but the fact that I have never seen it described is my excuse for presenting it.

The diagnosis of the position of the occiput can always be determined with accuracy by finding the posterior ear of the fetus and noting to which cardinal point the lobe points. In posterior positions of the occiput this procedure will not only permit of an accurate diagnosis but will also show in which direction the occiput is rotating. When the occiput is rotating anteriorly the lobe of the ear will point in the transverse diameter of the mother's pelvis and when it is rotating posteriorly it will point toward the promontory of the sacrum.

Breech positions are frequently made more difficult in their delivery by the arms becoming extended and difficulty is also often experienced in the delivery of the after-coming head. Both of these difficulties can be overcome in the majority of cases by the avoidance of certain frequent and fundamental errors of technic. From my observation the mistake is frequently made of making traction on the breech so soon as it is born and pulling the child out of the birth canal until the resistance of the head at the superior strait prevents further progress. This procedure results almost invariably in the extension of the arms over the head. The proper method of delivery at this point is to avoid traction upon the breech and to make pressure over the fundus of the uterus to push the child through the birth canal. If this method be adopted the arms will follow the chest of the child and will not become extended.

The second mistake is in the delivery of the after-coming head. The mistake is commonly made in the delivery of the head to so rotate the body of the child that its back points directly to the symphysis pubis. This maneuver throws the head of the child in the anterior posterior diameter of the superior strait. In the normal mechanism of labor the head descends through the superior strait in one of the oblique diameters and does not become fully rotated until it meets the pelvic floor. If instead of rotating the back of the child completely anterior it is rotated so that it is in an oblique position the head of the child is thrown into the opposite oblique diameter of the superior strait. As the anterior posterior diameter measures 11 cm. and the oblique diameter measures 12¾ cm., the gain in room is 1¾ cm. or nearly two-thirds of an inch. Furthermore, if the head is brought down in the oblique diameter it is very much easier to maintain flexion of the head which is also a most important factor in delivery.

Dr. George M. Boyd.—Occipito-posterior position is always an interesting subject and its recognition one of vital importance in determining the method of treatment. The method recommended by Dr. McGlinn is one which I feel sure the obstetricians of this Society resorted to, but it is not often mentioned in the text-books. I have been teaching that method. In my operative clinical work in emergency cases brought into the hospital, in which it has been rather difficult to decide upon the position of the occiput, it has been my custom in patients with history of occipito-posterior presentation to verify the position by reaching the lobe of the ear, then delivering the patient with the occiput in an anterior position rather than the posterior. Dr. McGlinn did not speak of the dangers of the occipito-posterior presentation so I shall not refer to that portion of the subject. I recall the teaching of Prof. Penrose at the University of Pennsylvania in the '80's, how he emphasized the dangers to be encountered in posterior position of the occiput. After gaining some obstetric experience the fear with which I was then embued from this teaching left me to some extent. We must realize, however, the importance of accurate diagnosis of the occiput. If the occiput is anterior and the pelvis of fair size we may follow an expectant course. If, however, it is posterior, it is only by timely and intelligent interference that we will be able to save the life of the child. Dr. McGlinn speaks also of the tendency to hurry through the normal breech case by obstetric measures and possibly by the use of pituitary extract. This course is injudicious.

Dr. Collin Foulkrod.—I am very much interested in Dr. McGlinn's paper on occipito-posterior positions.

It has been my misfortune to have found many more of these presentations than we are led to believe in our teaching.

The difficulty of diagnosis is so apparent and is evidenced in the records of the Presbyterian Hospital, which I have just gone over for the past year, where I find recorded twice as many R. O. A. positions as R. O. P. Here the diagnoses are made by a number of physicians and evidently they have put down the position as it emerges from the vulva rather than as that of which the head entered the pelvis.

This difficulty in making an accurate diagnosis can be explained by the fact that the long labor produces an increased molding which obscures sutures and fontanelles. So that in class work for the past ten years we have been advising students to search for an ear to make a positive diagnosis.

There are two difficulties in the procedure which should, however, be mentioned. It is not easy until after the membranes rupture; it is unwise to rupture the membranes either intentionally or by accident in occipito-posterior positions.

It is sometimes impossible to make the diagnosis without the use of mild anesthesia. There can be no criticism on this use of anesthesia; it serves many purposes other than the diagnosis; the cervix can be stretched slightly, the patient gets a moderate rest and relief from severe pain in the course of a long labor and very often wakens refreshed and ready for active termination of labor.

We do not use anesthesia enough as a diagnostic help in both obstetrics and gynecology.

Dr. J. O. Arnold.—This paper is especially timely, as Dr. Foulkrod had just pointed out. It has been my experience in meeting the general practitioner in obstetric work, that more mistakes are made in diagnosis, and as a result of inaccurate diagnosis, than in any other way. Only this afternoon I saw a case in which two or three fruitless attempts had been made at forceps delivery, which might have been avoided by making a diagnosis of the occipito-posterior position. The child was easily rotated and delivered when the correct diagnosis was made. Some years ago in a paper on "Diagnosis in Obstetrics," I called attention to this method of making sure of the exact position of the head, and especially emphasized the importance of a more frequent resort to anesthesia in cases of doubtful diagnosis. Without anesthesia there will be doubt in a large percentage of cases, and there is no reason why we should not oftener avail ourselves of this help. There is just as much necessity for making accurate diagnosis in obstetrics as in any other field of practice. Men who would not think of treating disease in any part of the body until they had exhausted every means at their command for making a diagnosis, even to the calling of expert help, will unhesitatingly apply forceps, or attempt other obstetric procedures, without any serious effort to make a diagnosis. The point is well taken that we should give more attention to exact diagnosis in labor, and in cases of doubt, that anesthesia should more often be employed for this purpose.

Dr. Daniel Longaker.—My experience bears out the point that the occipito-posterior position is not infrequent. The great majority, however, rotate anteriorly and are delivered as anterior positions. It is comparatively infrequently that such a case terminates spontaneously as a persistent occipito-posterior position. About a year ago I remember a case of this kind in which there was a surprising length of time between the onset of the second stage of labor and the birth of the head. The woman delivered herself, but only after the lapse of considerable time. I have seen the same thing occur only two or three times in my entire experience.

Dr. William R. Nicholson.—I, of course, entirely and thoroughly agree with what Dr. McGlinn has said in his paper. We all know the difficulty of diagnosis and in the attempt to apply forceps to a head unless one is absolutely sure of the position of the head. A method of diagnosis in the hands of many men is the use of the position of the heart sounds. This is, I think, an absolutely unsafe method, and vaginal examination will show the head to be in a different position than that indicated by the heart sounds. It is, of course, often impossible, in a primiparous vagina, to reach the ear unless the patient be etherized. I think the general practitioner should be repeatedly warned about the danger of putting on forceps unless he has definitely determined the position of the head.

I should like to mention a case which was interesting to me, that of a woman brought into the service of the Presbyterian Hospital Maternity about two weeks ago with a history of two convulsions that morning. The woman was a primipara at term. The blood pressure was 175. I advised sweating and purging, as I am not yet sufficiently radical to deliver at once in such condition. At about six in the evening the patient became somewhat comatose and had another convulsion. Within the next hour she had three more, making six altogether. I then decided to deliver her and found upon examination that the membranes had been ruptured. The dilatation was about half the full amount. The cervix seemed to be dilatable. I, therefore, proceeded to do manual dilatation and delivered with low forceps without difficulty. She had one convulsion on the table and after delivery she had a hemorrhage. I did not give her ergot, thinking it might be as well that she bleed a certain amount. She bled unduly, however, and we were obliged to pack the uterus. When she was taken off the table her condition was not very good, but not alarmingly bad. The baby, born after the seventh convulsion, was in good shape. Some hours later I received word that the woman's condition was desperate, pulse 150, bleeding, no color in her lips and her ears were transparent. I felt that the outcome would be death but suggested salt solution and hypodermics of pituitrin. I later called up the hospital and found that the woman was still alive, but not in any better condition. The pulse was practically uncountable and she had been unconscious since delivery. After an hour when the resident was about to give the salt solution he found the pulse to be 96 and the blood pressure 140. Since that time she has progressed favorably. From the condition in which I saw the patient the night before, as described to me in the middle of the night and in the morning, and from the sudden change within an hour, I felt it was possible that the dose of pituitrin in the morning might have aided in restoring the balance of her circulation, and that the bleeding may have prevented toxemia. I believe strongly in venesection in eclampsia, but I never would dare bleed to the extent that this woman bled. The woman has picked up and her color is good. I do not attempt to explain the case but it has impressed me as one of considerable interest.

DR. COLLIN FOULKROD.—In such a case as that reported by Dr. Nicholson I want to suggest the use of normal serum. We have used it with some benefit in the toxemic bleeding of babies and also have tried horse serum in toxemic women. The results in the latter condition are in doubt.

DR. EDWARD A. SCHUMANN.—I should like to ask Dr. Nicholson in what respect this case differs from those surgical ones we used to see when we were assistants in hospital service, in which there was hemorrhage with toxemia and which we termed primary shock. In from four to twelve hours the patients rallied, the blood pressure rose and the pulse dropped. To me Dr. Nicholson's case is a typical one of traumatic shock.

DR. J. W. FITHIAN.—I should like to ask why Dr. Nicholson did not deliver his patient in the morning upon admission and thus reduce the blood pressure. I would also ask how much salt solution he gave, and what amount there was of excretion from the kidney?

DR. NICHOLSON, closing.—Answering Dr. Schumann, the case differed very markedly from cases of primary shock. The woman had not had trauma. She had been having a toxemia. The fact that the baby was alive showed either a selective action of the placenta or that the toxemia was not a very severe one. I do not think that the theory of shock will explain the case. I fancy I have seen the cases to which Dr. Schumann refers but the present one does not impress me as one of that kind. Answering the question of why the woman was not delivered—simply because I do not think it is a wise procedure when a primipara comes into the hospital to deliver her invariably by surgical means. I do not mean to say that no woman should be so delivered. This woman seemed to have a mild toxemia and I did not think the case a suitable one to deliver. I do not think vaginal Cesarean section is a suitable operation at term and the woman's condition did not demand rapid delivery by abdominal section. The woman was not bled because the blood pressure was only 175. My enthusiasm for bleeding has been somewhat held in check by the experience of men in whom I have confidence that bleeding in relatively low blood pressure in eclampsia is not advantageous. The amount of salt solution given in the vein was I think approximately 300 c.c. and by hypodermoclysis a moderate amount each time. Two doses of pituitrin were given, one in the night and one in the morning.

Dr. George Erety Shoemaker.—I have under my care a patient whose entire urethra has been destroyed by sloughing. There is even no external meatus. I should like to ask whether any one has had a case in which there has been restoration of the sphincter action in such absence of the urethra.

Dr. Barton Cooke Hirst.—I had such a case under my care in the Philadelphia Hospital. The patient was a girl of fifteen years of age and illegitimately pregnant. She had gone to the mountains of Virginia and was delivered by a midwife. When she came under my care the lower portion of her uterus was torn away, the uterine cavity obliterated and the whole of the urethra, the base of the bladder, the sphincter and vaginal septum were torn. I operated upon her and she has a degree of continence of urine which satisfies her. It required some five plastic operations on the base of the bladder and upon the part where the urethra ought to be to gain the result. By bringing the tissues of the anterior vaginal wall together and utilizing fibers of the muscles of the trigonum she was able to hold her water for two or three hours. Another case seen a couple of years ago was one of the same condition in which the woman had continence restored by triangular denudations of the anterior vaginal wall and the union of the two sides of that wall so that considerable pressure was made at a place corresponding to the neck of the bladder. On the contrary, I had a case of an old woman upon whom I operated four or five times with entire failure. Her sphincter had been ruptured by a digital examination of the bladder made in another city. There was not a trace of the sphincter. My operations, including all the methods usually resorted to, were total failures.

TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

Meeting of February 9, 1915.

The Second Vice-President, Dougal Bissell, M. D., *in the Chair.*

Dr. E. W. Pinkham reported a case of

TRANSPLANTATION OF BOTH URETERS INTO THE BLADDER.

The patient, Mrs. F. S., aged twenty-six, a nullipara, married five years, applied in September, 1914, giving the following history. About eight months ago she noticed a slight intermenstrual flow, which had a very strong odor. Before that her periods had been regular, of the twenty-eight-day type, lasting about four days. At about this time she began to have sharp pains in both sides of the pelvis, which at times radiated upward toward the flanks. These pains soon localized on the left side. She consulted a doctor, who told her she had kidney stones and gave her medicine to dissolve them. Receiving no relief by this treatment, she applied to the clinic of one of our large hospitals, whence she was sent into the hospital with a diagnosis of uterine tumor. The operation consisted of a "burning with electricity." She was in the hospital ten days. This was in the month of August. Since then the flow has been almost continuous with a very foul odor. She complained of pain, severe at times, especially on the left side deep down in the pelvis and over the sacrum. Examination revealed a large cauliflower growth of the cervix, filling nearly the whole upper vagina. On this growth was some evidence of the former cauterization. Bimanual examination showed infiltration all around the cervix deep into the left broad ligament. She entered the Woman's Hospital and on October 1, Dr. Pinkham performed the Percy baking operation, following very closely the originator's technic. Before applying the baking instruments, a section of the growth was removed for pathological examination. At the end of ten days, a good sized cast of the uterine cavity was expelled. The bleeding had entirely stopped. At the end of three weeks the patient left the hospital entirely relieved of symptoms. Pathological diagnosis: squamous-celled carcinoma.

On December 10, 1914, she again complained of a dull aching pain in both loins and back, at the height of the twelfth rib. She said that for three days she had passed only a tablespoonful of urine each day. Examination did not reveal a full or distended bladder. Catheterization brought no result. The patient was then cystoscoped and an attempt made to catheterize the ureters. Both catheters entered the orifices easily and penetrated about 2 cm. No amount of manipulation could effect a deeper penetration. It was very evident that there was obstruction to both ureters. There was at that time no edema of any part. The patient was advised to go immediately to the hospital, but she refused, saying that she would rather die than to submit to another operation.

On December 16, 1914, the patient went to the hospital of her own accord. At that time her suffering from backache was intense. She was constantly drowsy and vomited frequently. She felt herself growing progressively weaker. For one week she had passed no urine. Her face, abdomen, legs and back were gradually swelling. Her mind was perfectly clear and her eyesight unimpaired. She had no headache. Examination showed a marked dropsical condition of her whole body, especially the abdominal wall. Blood examination, 27,600 red cells, hemoglobin 45 per cent. She was immediately taken to the operating room and gas, oxygen and ether were administered to her. A median longitudinal incision was made from the umbilicus to the pubis. On section of the abdominal wall, a great quantity of watery fluid ran out. Inspection of the pelvis showed a small uterine body erect and firmly imbedded in a mass of exudate and connective tissue. There were a few viscereal and adnexal adhesions. Both ureters were traced to the base of the bladder, where their structure was lost in the mass of cicatrix and exudate. Both ureters were dissected from their sheaths from the point where they cross the iliac vessels down to as near the bladder as possible, where they were tied off with linen. A temporary ligature of tape was then tied around the ureters near the linen and the ureters severed between. As it was impossible to implant the ureters in the bladder without undue strain, that organ was dissected away from its anterior and lateral attachments. A median incision was made in the anterior wall of the bladder, 2.5 cm. in length, through which two small punctures in the posterior wall near the fundus were made, about 2 cm. apart. The uretal ends were then drawn through these openings, leaving 1 cm. inside the bladder. The ureters were fixed by three iodized catgut inside the bladder and four linen sutures outside. The cuffs inside were split and sutured to bladder wall with catgut. The anterior incision in the bladder was closed in two layers with iodized gut. The rents in the peritoneum made by dissecting the ureters and bladder, were not closed as the patient's condition was far from good. Abdomen closed in layers with a drain down to the fascia. A self-retaining catheter placed in the bladder. Patient made a good recovery. Passed 3 ounces in the first five hours and 10 ounces in the first twelve hours. Examination of the first specimen showed a specific gravity of 1030, acid reaction, albumin and sugar tests negative, many red blood cells, few white blood cells and a few granular casts.

The amount of urine increased rapidly and at the end of eleven days the catheter was removed. Since then the patient has had no difficulty with the urine. Patient was up on the twentieth day.

She is in the hospital now, being treated with radium, locally applied, which seems to have some effect in at least controlling symptoms and retarding any rapid growth. The abdominal wound drained water for ten days and then healed by first intention.

The three interesting points in this case are (1) the superiority of the Percy operation over cauterization in cancer of cervix, (2) a complication which may follow such a procedure and (3) the duration of anuria (ten days) with recovery and without any very serious organic disturbances.

Dr. Pinkham also reported a case of

INTESTINAL OBSTRUCTION COMPLICATING PREGNANCY.

Patient, Mrs. E. P., aged twenty-three, married eight years, had one miscarriage, which had been induced for therapeutic reasons, according to her statement. Seven years ago she had been operated on at one of our well-known hospitals. She had a right salpingo-oophorectomy and appendicectomy. She was admitted to the Woman's Hospital at 5 o'clock, Jan. 5, 1915, with the history of having started an abortion at seven months on January 1. Several doctors had attempted to complete the abortion, but had been unsuccessful. Her pains had been regular and very severe from the start, but had grown weaker and more irregular the past twelve hours. The patient's husband said that since January 1 her bowels had not moved, although an enema given on the third brought forth some gas and fecal particles.

Examination of the patient showed a very distended abdomen, through which could be felt an enlarged uterus at about seven months. There was some tenderness on the right side, but not very marked. Her face had the drawn, pinched look of intense suffering out of all proportion to a difficult abortion. The pulse was rapid, 132 and thready. The respirations were 48 and temperature 99. The os was dilated and the head felt at the brim. No fetal heart could be heard.

An immediate emptying of the uterus was done under ether, during which the patient collapsed, but was revived by saline enema. No relief followed the abortion. The patient was given saline infusion, 900 c.c. and camphorated oil, at intervals, together with morphia. The patient died at 6.40 A.M.

It was very evident that there was present some very serious abdominal condition, therefore an autopsy was requested, but refused. For this reason an acceptable cause of death was not given.

The coroner was then notified and performed an autopsy. The following is a report of the postmortem findings.

Autopsy Report.—On opening the abdomen distended coils of intestine present with considerable quantity of free, grumous fluid. In the right iliac region is seen a coil of intestine the circulation of which is entirely shut off. On further dissection it is found that 3 inches above the ileocecal valve there is a loop of small intestine constricted both above and below by a fibrous band of great strength and fineness. This is about 3 cm. in length and perhaps 1 mm. in thickness and extends from the mesenteric attachment of the small intestine starting 3 inches from the caput coli, crossing over the small intestine and thence across the returning coil of intestine 12 inches above, to be attached again at the mesenteric attachment of the intestine, thus entirely occluding a loop of 12 inches. There is a large quantity of bloody, fibrinous and purulent fluid in the iliac and pelvic regions. There is a diffuse peritonitis over the posterior surface of the uterus, the broad ligaments and the adnexæ of the right side. There is fibrin on the upper surface of the liver.

Kidneys; cut surface is cloudy and shows hyperemia in the lines of the vessels. Capsule peels smoothly. The cortex is not reduced.

Spleen; not enlarged, pulp somewhat increased.

Liver; cut surfaces cloudy and yellowish.

Uterus; enlarged, flabby. On section the mucosa has disappeared and the surface is ragged and hemorrhagic. The cervix shows deep sulci and much hemorrhage.

Lungs; deeply congested throughout; no solidification.

Heart; valves and cavities normal.

Microscopical Examination.—Uterine wall shows very large sinuses, partly distended, the walls of which show some trophoblast. There is slight inflammatory reaction. The section shows no compacta.

Ovary shows no corpus luteum, but numerous primorldial follicles.

Kidney shows a swollen and seminecrotic tubular epithelium. Glomeruli are normal.

Diagnosis.—Acute general peritonitis with parenchymatous degeneration of kidneys and liver, gangrene of small intestine with obstruction by fibrous mesenteric adhesions, endometritis postabortum, edema of lungs.

DISCUSSION.

DR. HERMANN GRAD, in opening the discussion, said: I believe that the report of Dr. Pinkham is of very great importance. If we are going to use the operation as shown to us by Dr. Percy we ought to take this case of Dr. Pinkham into consideration because of the possibility of this serious complication being the result of the cauterization. Since Dr. Percy has shown us the method at the Woman's Hospital I have had a chance to use it on four different cases, all of them cases of inoperable carcinoma of the cervix. I found after my first case that I could do very much better manipulations if I had my own hand in the abdomen rather than that of my assistant. Another point is this: that the water cooled speculum must be pushed all the way up in order to clear the base of the bladder. If this precaution is carefully observed I don't think we will have any trouble as far as injuring the ureters by heat is concerned unless they themselves are involved by the cancer. With one hand in the abdomen the position becomes tiresome for the operator if one has to keep up the burning for any length of time, but one can ease up on the situation very nicely by having one's left hand in the abdomen, and standing in such a way as to have very little strain on the hand.

With regard to the cauterization itself: I have found that if we get the cautery too hot it bakes a layer of tissue about the cautery iron so tough and so thoroughly that it is very hard to get beyond this baked layer. One must guard against this overheating of the irons. If we bake that layer of tissue around the instrument very thoroughly, no matter how much heat we apply afterward, cauterization does not extend beyond that point. When we first start the operation we should not have the iron too hot, should seek out the cancerous areas and bake it thoroughly.

The second case of Dr. Pinkham's I saw at the autopsy, it was a remarkable specimen, the coroner's physician made a fine dissection of it and it was interesting to see how a fine band of tissue could constrict 7 inches of the gut.

DR. G. G. WARD, JR., said: I was very much interested in the first case of Dr. Pinkham's. I have had some little experience with the Percy method of cauterization and so far have been quite satisfied with the results.

In one case in particular that I did last October, and which was in an inoperable condition, it was hard to get your finger into the vagina owing to the extent of the disease. One of the chief symptoms that she complained of was inability to empty the bladder owing to the fact that there was a nodule pressing on the base of that organ, close to the urethra, which prevented the emptying of the same so that it was necessary to resort to catheterization. In that case it seemed as though the disease had progressed almost too far to attempt to do very much, but they were anxious to have something done, so I offered the Percy method. The operation took fully two hours, with the abdomen open. I did a very thorough cooking and the nodule causing the obstruction was so reduced that the woman has had no trouble in emptying her bladder from that time. That was last October and I saw her son-in-law three or four days ago and he said you wouldn't know there was anything the matter with her as far as appearances and general comfort were concerned, and that while thoroughly understanding the inevitable result, they were very well satisfied that she had had that amount of comfort which the operation gave her.

I can echo what Dr. Grad has said so far as the method of technic is concerned. I have not tried putting my own hand in the abdomen, but I think that is a very good suggestion. With the point of putting the speculum in deeply I thoroughly agree. Getting a thorough dilatation at first is the hardest part of the operation to me. I had to make some wide incisions in order to stretch the parts so as to get the water cooling instrument in afterward. The mistake which one is apt to make is that of overheating the iron and, of course, Percy in his demonstrations to us repeatedly emphasizes the importance of the comparatively low heat of that iron and the only way you can get at this is by constant testing of it on gauze to prove that it is not too hot.

I think it is unfortunate that we haven't heard more from Percy as to his ultimate results. I have been interested to know how long his cases get along in comfort and what I would like to know is, What is his ultimate summary of the method in a large number of cases? That I have been unable to ascertain and if any of the members present know his ultimate results I, for one, would be very glad to hear them.

Dr. F. A. Dorman, in discussion, said: As far as the second case of Dr. Pinkham's is concerned, I know of no more distressing dilemma than to have a woman near term with associated signs of intestinal obstruction.

It was my misfortune two or three years ago to have a somewhat similar case, a private case of my own that I had operated on about a year previously for ectopic, so she had an antecedent history of intraabdominal interference. She went practically to term and sent for me from the (suburbs). She was complaining of very severe pain in the abdomen, thinking, I suppose, of beginning labor. The condition was that of fairly complete intestinal obstruction. By means of enemas and posture a little gas was passed, and that was all. As the night wore on (I was called in the evening) and the pain was so marked and our efforts so unavailing, her condition still being good, we got her in town and watched and treated her through the day without any gain or progress at all, so we decided to try the expedient of inducing labor. With the induction of labor—just about that time—something let go and the woman began to pass gas freely and she passed out of the condition of acute pain, seemingly relieved of her shock, and went on in labor. The bowels began to move fairly freely and the crisis passed over. But I still have a picture of the dilemma of a woman practically at term with signs of increasing obstruction and approaching shock. The fortunate thing was that the patient was seen early and that before the conditions were extreme, the obstruction was relieved.

DR. DOUGAL BISSEL said: Intestinal obstruction, as is well known, may follow not only intraabdominal operative procedure but any inflammatory action in the peritoneal cavity.

It does not often fall to my lot to operate on men, and it is very seldom that I remove the appendix through the McBurney incision under any circumstances, so that the case I am about to relate stands out vividly in my mind for more than one reason.

One week or more following an acute attack of appendicitis, I removed through the McBurney incision a badly diseased appendix. The abdominal cavity beyond the immediate region of the cecum was then not explored, the work being confined absolutely to the right iliac fossa. Six months after recovery, the patient developed suddenly an intestinal obstruction. I then opened him in median line and immediately below my incision I found just such a condition as reported by Dr. Pinkham. In another part of the abdomen I found a second band or loop through which a knuckle of intestine would some day have passed and become obstructed.

It has been my practice for many years never to operate for the removal of the appendix in women through the McBurney incision. I prefer and strongly advocate the median abdominal route as it permits a complete exploration of the abdomen and affords opportunity to remove not only such conditions as are occasioning immediate trouble, but also such as might result in future complications.

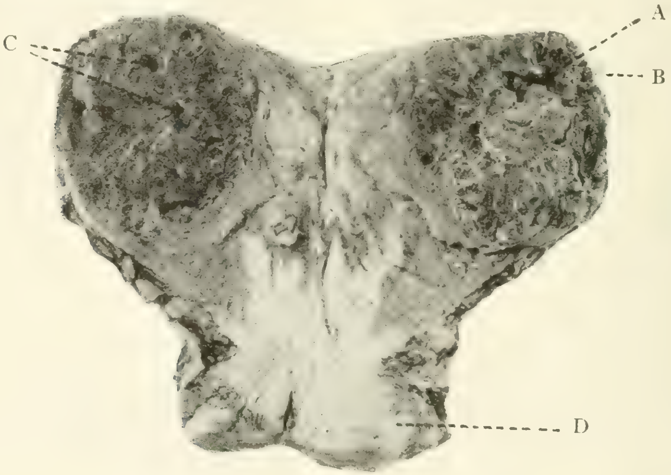
DR. CLARENCE R. HYDE, presented a

REPORT ON A CASE OF PERFORATION OF THE UTERUS, DUE TO CHORIOEPITHELIOMA, AND SIMULATING RUPTURED ECTOPIC.

The patient, an Italian, aged forty-eight, was admitted to my service in the Long Island College Hospital, October 23, 1914, suffering from profound shock. Her facies was pallid and anxious. She was pulseless, very restless and had sighing respiration. Owing to her inability and that of her friends to speak English, only a meager history could be obtained. Facts were later elicited which might have made possible an anteoperative diagnosis. It was, however, determined that her last menses occurred August 23, 1914, and since that time she had been nauseated and had complained of constant pain in the lower abdomen, more on the left side, in the ovarian region.

On the day of her admission to the hospital, while walking upstairs, she was suddenly seized with a severe pain in the lower abdomen, followed by collapse. Her Italian physician made a diagnosis of ruptured ectopic and hurried her to the hospital where she arrived about noon. She was seen by me within a half hour after her arrival. Abdominal examination revealed a very tender and tympanitic abdomen. Pulse could not be counted. Temperature subnormal. Respiration increased and sighing. Vaginal examination showed a large cervix, in position, exquisitely sensitive to motion in any direction. Uterus large, about the size of a three months' pregnancy, movable, but giving pain on motion, and in good position. Both lateral fornices very tender, but nothing definite could be mapped out in the nature of bogginess or a mass. A presumptive diagnosis of ruptured ectopic was made, but owing to the patient's critical condition, operation was deferred and the expectant plan of treatment was followed. Systolic blood pressure, 60; diastolic, 40. Hemoglobin, 65 per cent., R. B. C. 3,500,000. Leukocytes, 16,880. No differential count was made. The patient was placed in the Trendelenburg posture, and morphia administered hypodermatically, gr. 1/8, q. 3. h.

The following morning, October 24, at 8.00 A.M. her pulse was 140, easily counted, fairly strong and full. Blood pressure had risen to 122, systolic, and 80, diastolic. Patient much brighter, seemingly in good condition and not suffering from much pain. We decided to operate at once.



Chorioepithelioma of the Uterus.

Uterus split open, showing location of the bisected growth, which occupies most of the left half of the uterine body.

A—Point of rupture.

B—Strands of catgut employed to suture rent in the uterine wall.

C—Large venous sinuses.

D—Cervix split open.

Curiously enough, none of this growth encroached on the endometrium.

On opening the abdomen through right rectus incision, a large amount of free blood and large clots escaped. A quick exploration of both tubes showed them normal to touch. The posterior surface of the uterus was felt to be rough and friable. The uterus was drawn out of the incision, when it was discovered that there was free and copious hemorrhage from a rent in the posterior uterine wall, about

5 cm. in length, on the left side and below the left cornu. We now suspected that there had been an attempt to empty the uterus of the products of conception, prior to her admission to the hospital, due to a mistaken diagnosis and that the curet had perforated the posterior wall.

Immediate hysterectomy was thought of, but as the patient's condition became, at this juncture, so alarming, the rent was closed by interrupted plain sutures, and the abdomen closed. She died in twenty-one hours, in profound shock, never rallying.

An autopsy was obtained and the uterus removed. When the uterus was split open, it was discovered that the whole left portion of the body above the internal os was the seat of a tumor mass, as shown in the accompanying plate. A portion of this growth had perforated the uterine wall, giving rise to the symptoms, as above noted. The autopsy further revealed that there were metastatic deposits in the lungs. Some of these were also removed for pathological examination.

The pathologist's report showed sections of uterine and pulmonary growths to be chorioepithelioma.

Before the patient's death additional facts were obtained in her history which shed light on the whole condition. It appears that in June, 1913, about sixteen months before her admission to the hospital, she had been curetted for a hydatid mole, vouched for by her Italian physician whom I interrogated. This fact, had it been known prior to operation, might have cleared the atmosphere. But the absence of her menses for two months, her nausea, abdominal pain, together with signs of active bleeding, led us to suppose that we were dealing with a ruptured ectopic. All the classical symptoms were present, and even magnified. The case is of more than passing interest in that it shows what a chorioepithelioma, if not recognized in time, may do in the way of causing perforation of the uterine wall and accompanied with alarming hemorrhage.

Dr. H. D. Furniss reported a case of

ACUTE HEMATOGENEOUS INFECTION OF THE KIDNEY.

Mrs. E. B., thirty-seven years old, mother of one child seventeen years old. No abortions. Had a perineorrhaphy two years ago. January 10, 1910, while in theater had severe chill, followed by rise of temperature and some pain in left kidney region. Condition first diagnosed as typhoid, but later as an infection of the kidney. Was ill about four weeks with this. Radiographs and a shadow in the pelvic portion of the right ureter was found. After this attack she had more or less bladder disturbance with some pus in the urine. On January 10 of this year she had grip. Seen on January 28, when she was suffering with pain in pelvic region due to chronic tubal trouble. On February 1, ureteral catheters were passed without meeting any obstruction. At this time there was a profuse flow of light-colored urine from each kidney, containing no pus. February 4, radiographs were made with *x*-ray catheter in right ureter, and it was found that the shadow before observed was out of the course of the ureter. That night the patient had a chill, temperature went to 101° F. and there was marked pain in the right renal region. From then on she has had several chills with temperature from normal to 105° F. for four days. After that the temperature ran from 102° to 104°, but there were no more chills. Pus was found in the urine. The blood count showed a moderate leukocytosis, but the differential count was not high. On February 14, the right renal pelvis was irrigated with nitrate of silver, but this had not the least effect upon the course of the trouble.

On February 19 and 20 the temperature rose to 104°, and the blood count showed 20,000 white cells and 80 per cent. polymorphonuclears. At no time did the pulse go over 105, and was always of good quality. From the start of the disease the patient was much of the time irrational, and on occasions delirious. February 21 under gas-oxygen anesthesia, after giving a preliminary intravenous saline infusion of normal saline, a nephrotomy was done. The kidney was much enlarged and congested, with a very adherent capsule. The patient's condition did not improve, so on February 23, under gas-oxygen anesthesia the kidney was removed, after first catheterizing the left ureter. Urine from the left side showed a small amount of pus. After this the patient made a good recovery, though the first few days were rather stormy.

Upon examination the kidney was found much enlarged, the capsule thickened and very adherent. After removing the capsule hemorrhagic spots were seen. In only one spot pus was found. The cultures made from the kidney showed growths of streptococcus and colon bacillus.

Dr. Furniss also reported a case of

PERINEPHRITIC ABSCESS DUE TO ACUTE HEMATOGENOUS INFECTION OF THE KIDNEY.

Mrs. C. T., aged twenty-nine. Married. Mother of one child. The early part of October, 1914, she had a boil on right shoulder that gave her very little trouble and healed in due time. On October 23, she had a chill and rise of temperature. The temperature ran from 100° to 103° until I saw her, on November 11. She had a weakly positive Widal on November 9. Blood count showed 16,000 leucocytes, with 80 per cent. polynuclears. A few days previous to November 11 she had some pain in the left side of the abdomen, and a sense of resistance was felt there. When I first saw her the temperature was 101°, there was slight pain in the left upper quadrant, and a mass could be felt just below the free border of the ribs. The catheterized bladder urine showed only a few leukocytes and no albumin. Indigo-carmine injected intravenously did not appear on the right side until ten minutes had elapsed, and on the left not until after thirteen minutes, and was fainter than on the right.

On November 12 an incision was made over the left kidney, through hard dense tissue, and an abscess containing 8 or 10 ounces of pus was evacuated. The kidney felt rough over the lower pole, but could not be well exposed without making a much larger incision; therefore a thorough examination of the kidney at this time was not made. Wound drained. Contrary to expectations the temperature did not drop, but ran the same as before. Blood culture was negative. After three weeks, as the patient was getting weaker, another incision was made down to the kidney, just below the former one. There was great bleeding from the adhesions that had to be gone through. The kidney was with difficulty delivered, and after clamping the vessels and the ureter it was removed. The patient was in such bad shape that the clamps were left on and the wound closed.

As she continued to grow worse and death seemed imminent from the blood loss, 500 c.c. was transfused from the husband by Dr. E. W. Peterson, two hours after finishing the operation. She immediately rallied and made a good recovery.

The specimen showed that the kidney was not enlarged. At the lower pole on the posterior side something was present like a carbuncle; when this was cut and pressed upon pus exuded from a number of openings. There is also to be seen just above this the roughened kidney surface which formed the anterior wall of the perinephritic abscess.

The points of interest in this case are the history of a boil, followed by temperature, very little pain over the kidney region, the absence of pus from the urine, and the little disturbance of renal function as compared to the opposite kidney, and the sharply localized infection of the kidney. Aside from the temperature there was little constitutional disturbance and none of the delirium which was so marked in the other two cases reported to-night.

Dr. Furniss then reported a case of

ACUTE POSTPARTUM HEMATOGENOUS INFECTION OF KIDNEY.

Mrs. F., aged twenty-two. Married. Last menstruation February 27, 1914. In the first three months of pregnancy she had much nausea, and in July suffered with a great deal of abdominal pain. Occult blood was found in the feces. From August 20, to Sept. 6 she was put on an ulcer cure. After this it was difficult to keep up her nourishment without producing a great deal of pain. There was no evidence of bladder or kidney trouble until after labor. The patient was very much run down, weakened, and suffering from a marked secondary anemia (3,000,000 red cells and 60 per cent. hemoglobin) when she went into labor. The first stage lasted only six hours. After an hour and a half in the second stage, with no effective pains (and these could not be strengthened with pituitrin), low forceps were applied and a small child delivered. Perineum torn in the second degree; immediate suture.

Catheterization was necessary for four days, after which time she began to void spontaneously. She from this time had a great deal of bladder discomfort and voided every half to one hour, the urine containing much pus. On the fifth day postpartum she had a temperature of 100.5°, and on the sixth began to have some pain the right renal region. On the eighth day the temperature was around

103°, and she became markedly delirious, which persisted. On December 18, the thirteenth day postpartum, she was seen in consultation with a urologist and a gynecologist, and a waiting policy was agreed upon. At this time cystoscopy showed marked edema of the trigonum, the ureters being hidden away in the mucosal swelling; the rest of the bladder wall was almost normal. Both ureters were catheterized. The urine from the right showed a large amount of albumin and many pus cells. That from the left a small amount of albumin and only a few pus cells.

On the fourteenth day postpartum she had in the afternoon a chill and rise of temperature to 104.4°, with a pulse of 160 to 170. At this time the patient was in coma and could not be aroused. The right side appeared more tender than the left, as pressure here made her wince; there was rigidity over the muscles of the right side of the abdomen and back. At midnight on the nineteenth, or the fourteenth day postpartum, I removed the right kidney.

It was somewhat enlarged and had numerous small abscesses scattered through the parenchyma. The pelvis was much dilated, and acutely congested. The pathologist reported it as acute infectious pyelonephritis. My opinion is that the infection was hematogenous in origin.

In spite of everything we could do the patient failed to come out of her coma and died twenty-five hours after the operation, fifteen days postpartum.

DISCUSSION.

Dr. Austin Flint, Jr., said: It is undoubted, as we gain in experience, that we find a great many of the cases which were supposed to be cases of simple puerperal infections to be really colon infections, and, with more exact methods of diagnosis, found to be infections of the kidney. The ones that I have seen in the hospital and have followed up more or less have, all gotten well with urotropin and large quantities of water administered by mouth. The urine would gradually get less cloudy, they would pass more, the temperature would come down and ultimately they would get over the acute attack. The same has been true in, ten or fifteen cases of antepartum colon infections of the kidney that I have seen. They have all gotten well with a lot of water and urotropin and letting them alone.

I think it is important to study these cases and I would like to know what the experience of other people has been with regard to the frequency. Ten years ago, or thereabouts, I would say they were very rare. In the last ten years they have been more common. Postpartum temperature and chill are apt to occur a little bit later than the second or third day and we are at a loss to account for the symptoms until finally the diagnosis is made by urinary examination. The urine is found loaded with pus and a diagnosis is made of kidney infection. My experience is that they all get well with internal antiseptic treatment.

The question which I would like to ask, Mr. Chairman, is in regard to the frequency with which these cases are met as a complication of either pregnancy or the puerperium.

Dr. O. P. Humpstone said: I would like to bear witness also to the views as expressed by Dr. Flint. In our hospitals in Brooklyn, where we have been investigating the urine and have been very careful, in all our cases of sepsis after birth we have found the same thing and our experience has been that they get well if we let them alone.

Now what I would like to find out is, What have we to recognize as the fact when it is necessary to operate in these cases? There must be some definite diagnostic point to tell us that this case must be operated on. I have never yet seen a case that seemed to me should be operated on. I am referring particularly to colon infections postpartum.

Dr. G. G. Ward, Jr., said: I have recently had a very strenuous experience in a case of colon infection in both kidneys, occurring postoperatively. The patient had had a simple Gilliam operation, appendectomy, and plastic on the pelvic floor. There was nothing unusual about the condition. She made the average recovery and was out of bed. Two days after being out of bed she suddenly had a chill with high temperature, preceded by an irritable bladder which, of course, made us suspect the possibility of pyelitis, and which it so turned out to be. At first, she had only tenderness on the left side—discomfort. We couldn't make out any tumor. There was a great deal of pus in the urine. At my own request, Dr. Furniss catheterized the ureters in this case, my object being to make more certain that it was a pyelitis of the left kidney. As I look back on the case now I am inclined to think that perhaps there was nothing gained by it. Dr. Furniss had great difficulty in getting into the ureters as the bladder showed marked evidences of involvement. The left ureter he could not enter. The right ureter he catheterized and got pure colon bacillus in small quantity from that side. The ultimate history of the case was that she got well from the left-sided trouble and then had a right-sided pyelonephritis, which was far more severe than the original pyelitis, and I have rarely seen a case so desperately ill get well. She had successive flare-ups of very high temperature (105–106) with severe chills and other evidences of profound septic absorption and it seemed as if she was going to die. The pulse reached 150–160. Her right kidney was decidedly more sensitive and tender than the left had been. The attacks of high temperature lasted for three, four or five days. The question as to whether there was a perinephritic abscess present was considered and a consultation decided that there was not any definite evidence of it at that time. Later Dr. Lillienthal saw her and he felt there was pus around the kidney and urged exploration. An aspirating needle was passed by him under the diaphragm and above the kidney, but he got nothing, which was disappointing. In spite of this he said 'I would operate any way; I would cut down and look at the kidney. I feel there is something there.' Under gas and oxygen anesthesia I made a rapid exploration of the kidney and delivered the organ out of the incision. It was swollen to twice its normal size and it had deep-colored nodular areas on its periphery, but there was no gross pus in evidence. I decapsulated the kidney and took pieces of its substance for examination and the pathologist's report was that every cell was riddled with leukocytes and colon bacillus and that the condition present did not seem compatible with life. The next day the temperature was down to 101.5° F. I then transfused her by the Lindeman method which gave her a decided lift and she is now out and well.

The point of interest to me in this case is that if we had not catheterized that patient perhaps we might not have had an involvement on the other side.

Dr. R. M. Rawls, continuing the discussion, said: The following case I had the opportunity of seeing on Dr. Bissell's service at the Woman's Hospital. She was five months pregnant and had had a high temperature for two or three days. A catheterized specimen of urine showed colon bacilli. The urine from the right ureter showed a pure colon infection and the urine from the left ureter gave no growth. The temperature ranged between 103° and 105° and the pulse about 120 and the respiration between 20 and 30. She was given urotropin grains 15 and acid sodium phosphate grains 30 every three hours. The temperature continued for some time and we tried postural and dietetic treatment, but the temperature did not remain down very long. After two or three days further treatment the tenderness began to decrease in the costovertebral angle. There was no great tenderness over the kidney at any time. The acid sodium phosphate caused a diarrhea and we cut it down to 15 grains, at the same time we reduced the amount of urotropin as she had quite marked bladder pain with painful urination. After a time we were again able to increase the urotropin to 15 grains and the acid sodium phosphate to 30 grains and after a week her temperature remained normal and continued normal for another week. She was finally delivered and a specimen five months after delivery showed absolutely no colon infection and to-day, ten months after her confinement (Dr. Bissell has followed the case) she is perfectly well and has had no return of her trouble.

Another case I reported some years ago was a case of double pyelitis following a Gilliam operation and a curettage. She ran a high temperature, 104° to 105° for about three weeks. We used benzoate of soda and urotropin and an autogenous vaccine. In this case I was very much tempted to operate but as the ureteral catheterization showed both kidneys to be affected, I persisted in the treatment. For about three months after she left the hospital I used stock vaccine, 200,000,000 every week. I saw this case only a short time ago, after about three years, and she is perfectly well, has gained in weight and there has been no further return of the trouble and the urine is absolutely normal and shows no growth on culture.

Dr. J. M. Mabbott, in discussion, said: I feel diffident about asking a very simple question, but an ounce of prevention is worth a pound of cure.

I have been associated for many years in hospital and private work with Dr. E. L. Partridge, of the New York Hospital and the Nursery and Child's Hospital, and in his medical service at the New York Hospital he found that the men on the house staff were prone to catheterize the bladder. It is true also that in obstetrical wards, instead of getting the women to pass their urine by various means, the members of the house staff are prone to catheterize the bladder. Dr. Partridge told me that on one occasion his house physician in the New York Hospital had catheterized for various reasons three women, and had been cautioned about being too free in catheterizing women; that a certain number of them would develop cystitis. Fifteen years ago we didn't know much about the developing of secondary lesions of infection, but his house physician laughed and said he thought their precautions were sufficient. Nevertheless, two out of the three women then under consideration developed cystitis; and we have always felt that it is a rather serious thing to catheterize except for necessity. I mean that the ordinary house staff junior is sent or the substitute is sent to draw the woman's urine and I think that in many cases in the past infections have been directly due to that very thing and I just wish to ask the simple question of Dr. Furniss whether any or all of those three cases reported had for any reason been catheterized prior to the development of these symptoms.

Dr. H. D. Furniss, in closing the discussion, said: I think Dr. Bissell is right. I agree with Dr. Studdiford concerning catheterization of the ureters, and do not advocate it unless something definite, not to be learned otherwise, is to be found out. The more work I do, the fewer ureters do I catheterize. My endeavor is to find out the most possible with the least instrumentation.

The first case was one in which there was doubt as to whether there was or was not kidney involvement. I further partially agree with Dr. Studdiford regarding operation. This first case of focal infection of the kidney which was not drained by the incision of the perinephritic surely was one that needed operation. If I could have done a conservative operation and removed only the diseased portion of the kidney, it would have been ideal, but when one is working in a lot of scar and granulation tissue, with profuse hemorrhage, such nice work cannot be done. One has to get in and get out, and quickly.

In the second case the woman had been having pain over the right pelvic brim, and the *x*-ray ureter catheter was passed to determine if a shadow found in a radiograph she had had made was in the ureter. The subsequent catheterization was done because I thought that I had possibly stirred up a pyelitis, and I desired to wash out the kidney pelvis. She had an acute hematogenous infection right from the start, but I did not recognize it at once. This is also one of the cases that should have been operated.

In the third case the patient had been catheterized for a number of days after delivery, when she had a rise of temperature and slight pain in the right kidney region. Here catheterization was done to determine if she had an ascending pyelitis, and if both sides were involved. Had it been a simple pyelitis the installation of silver nitrate, that was done, would have benefited her.

I, as well as you, have seen numbers of cases of renal infection get well, but I think that all of the specimens presented here tonight should have been removed. I have had a number of post-operative renal infections, and these followed as a rule operations either upon the intestinal tract, or on parts that were in close connection. One of these was a patient of Dr. Pinkham and followed eight days after a curetment. Most of them get well, but in those cases attended with delirium, great prostration and the evidence of a very serious illness, I think that the best procedure is to remove the kidney.

As far as urotropin is concerned, I do not think it of any value in the acute hematogenous infections. Another point is that with it the best results are obtained in the first two days of its use. The bacteria soon become resistant to it, and it is best to try other antiseptics for a few days and then return to it for a couple of days.

In regard to catheterization, it should not be done when it can be avoided. Often 1 c.c. of pituitrin administered hypodermically when the bladder is full will cause the patient to void. This acts by producing diuresis, and by a selective tonic action on the bladder musculature. There is another important point about catheterization. In many hospitals no lubricant is used on the catheter, and this causes much traumatism. To appreciate this you have only to pass a lubricated and unlubricated catheter on the same patient.

Dr. Dougal Bissell said: Should I take part in this discussion, I have no doubt you would immediately surmise that before ending I would advocate fixation of the kidney, which is exactly what I am going to do.

To illustrate the desirability of kidney fixation for the prevention of infection I would relate a case with both retroversion of the uterus and prolapse of the kidney. It was a question as to whether I should replace both organs at the same time or only one, and if only one, which first. I chose to do the replacement of the uterus first. The result of the ligament operation was all that one could desire, but about fourteen days subsequent to the operation, the patient was taken with a chill, rise of temperature and pain in the right kidney region. Examination of the urine showed colon bacillus in great quantity. She was given urotropin and acid sodium phosphate in large doses and for several months, but the condition became worse instead of better and the prolapsed kidney increased in size, due in my opinion, to the fact that the kidney could not drain properly. The patient suffered to such an extent that I was eventually compelled to do a nephrectomy.

It is my belief that fixation of the kidney at the beginning would have permitted thorough drainage, and if infection followed, urotropin and sodium acid phosphate would have, as in the case of renal infection complicating pregnancy, acted to advantage.

At the time the case Dr. Rawls relates came under my care, Dr. Davis of Philadelphia was advocating strongly the opening and draining of infected kidneys complicating pregnancy. Dr. Rawls, with others, advocated the use of urotropin and acid sodium phosphates.

Operative procedure without first trying medicinal agencies seemed to me too radical. The patient, as Dr. Rawls states, was an extremely sick woman for a week or more, but her illness eventually terminated happily. Six months after a normal delivery, she became pregnant again and the urine, several specimens of which were examined, remained negative.

DR. W. E. CALDWELL read a paper on

A SERIES OF PLACENTA PREVIA CENTRALIS FROM THE SERVICE OF DR. FLINT AT BELLEVUE HOSPITAL.*

DR. AUSTIN FLINT, JR., in opening the discussion, said: I am naturally interested in the paper because the cases were taken mainly from the service I am responsible for, and I am also responsible for some of the treatment, which is put down as routine treatment.

I didn't have any idea when Dr. Caldwell spoke about presenting this paper that the report of these cases was going to be anything more than an informal report, and I didn't know that he was going into it so thoroughly, which makes it more interesting, although it leaves less for discussion.

Needless to say, I subscribe to the general principles of the paper because what we have to do in a service of this kind is the best treatment from a practical standpoint. It is all right for a theorist to say that the treatment for placenta previa centralis is Cesarean section, but in these cases, as they come to us in the hospital, they come in a condition where they cannot be subjected to an operation like abdominal Cesarean section with the expectation of getting good results. It is all right to operate on a woman with a good pulse, who hasn't lost blood and hasn't been infected by previous examinations. Such a woman ought to make a good recovery, but when we have a woman suffering from shock and hemorrhage that woman is not a good subject for a Cesarean section and the immediate problem before the house officer who receives her is to stop the bleeding. We have found that the way to stop the bleeding is to pack thoroughly with iodoform gauze inside of the cervix, and tightly in the vagina. This procedure gives time enough for the attendant to get there, and also gives him the opportunity of choosing whatever procedure he thinks most wise to deliver her with the least possible loss of blood. If you get to the hospital under these circumstances, you have the choice between removing the packing and delivering the child by the natural passages, or doing a Cesarean section. The cases that I have happened to see have all seemed to me to be proper cases to take out the gauze packing and deliver by the natural passages, and this procedure seems to me to offer the best chance for the woman, and a fair chance for the child.

There was a case which Dr. Caldwell referred to. I think it was two weeks ago. The fatal result as far as the child was con-

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* For original article see page 937.

cerned was really accidental. The fetal heart was still beating when the woman was delivered. She was bleeding rather profusely and on introducing my hand into the vagina and through the cervix I passed it up posteriorly as far as I could and accidentally separated the placenta from the uterine wall. In this case I had to withdraw my hand and subsequently perforate the placental tissue in front in order to get to the amniotic cavity, although the whole procedure took only a minute or two. In ordinary cases there is no reason to hurry except in the interests of the child. In this particular case a curious thing happened. During the extraction of the child large pieces of placenta came out and fell into the pan and I never for an instant thought after such an experience that the child could be alive, but in spite of that the child was born with the heart beating and made some feeble efforts at respiration, but never could be induced really to breathe. I mean there were only some contractions of the diaphragm.

There are a good many little points in the treatment of placenta previa centralis that I think could be emphasized and one of them is the immediate removal of the placenta. That, I think, is universally done. The other is the giving of an intrauterine douche with the addition of alcohol immediately after the delivery of the placenta. The third is the routine packing of the uterus to prevent subsequent postpartum hemorrhage.

I think Dr. Caldwell's presentation of this subject, or the presenting for discussion of the question, What is the best practical treatment for central placenta previa as we see it, packing with gauze to control the hemorrhage, followed by delivery through the natural passage, or Cesarean section?—is very opportune and very interesting. I have been on the lookout for a case to do a Cesarean section for central placenta previa that I thought was suitable and in an experience that is large I haven't happened to see one in the last few years.

The service that we are in control of—that we have at Bellevue—is really a very large service. In the month of December there were 200 cases. In the month of January there were 100 indoor and about the same outdoor, which really amounts to a large number when we remember the large number of ambulance and operative cases.

I am sure I would be very much interested in hearing what the other members of the society think about the treatment along the lines as proposed by Dr. Caldwell.

Dr. J. O. Polak said: We had two cases in the last five years which have been, in our judgment, favorable cases for Cesarean section (central placenta previa) with the first hemorrhage, who had not been examined outside, with the mothers in good condition and the child alive and practically at term. Both of these patients were Cesareanized, both were delivered of a living child and both mothers recovered.

We get at the Long Island College Hospital much the same type of cases that Dr. Flint speaks of—cases of questionable quality, and we have adopted the plan which Dr. Beach has described so excellently, namely, bipolar version and then allow the delivery to take its own course, and it is surprising if we watch those cases how little blood they lose and how perfectly the uterus takes care of itself without this tamponade of the uterus, which I consider a rather dangerous procedure.

I would like to ask Dr. Caldwell to tell us why it is necessary to leave a tamponade in the uterus for four, five or six days—does it not promote sepsis? and is its continued use necessary to control hemorrhage? We have had some unfortunate experiences in leaving the tampon in longer than twelve hours, so much so that it is now our custom not to leave a tampon in these cases. Since adopting bipolar version to the exclusion of the pack, no injury to the lower uterine segment has been noted, it can be done so surely and with so slight a dilatation that, aside from a few cases where we have had to tampon the pelvis thoroughly to secure sufficient dilatation to do a bipolar version (which is exceptional), the treatment has superseded all others. Certainly the maternal mortality has been remarkably lessened. Of course, the advocates of the pack advance Cesarean section against the bipolar proposition, particularly as we use it, for by leaving the delivery entirely to nature, and I believe that this is the best plan, the child is sacrificed. On the other hand, on account of the friability of the uterus in central placenta previa, we all know that unless dilatation is complete, very extensive injury is done to that friable tissue and trauma is, to my mind, the greatest avenue through which infection takes place. Most of the cases brought in at Bellevue or the Long Island College Hospital have been tamponed or examined by two or three people on the outside, so they are liable to septic infection, so by minimizing the trauma by allowing the delivery to take place, spontaneously we have minimized our sepsis. We have had two or three cases in the past week which have run a perfectly aseptic temperature and it is remarkable how little blood is lost by this procedure.

In closing the discussion, Dr. Caldwell said: In answering Dr. Polak's question, I would say that Dr. Robert C. James, associated with Dr. Flint at Bellevue, has for years packed his operative cases, believing that the gauze makes a relaxed uterus contract, aids drainage, prevents pocketing of the posterior wall with sapremia infection, and thus prevents sepsis rather than causes it.

A few years ago we had a severe epidemic of sepsis in Bellevue and it was a strange fact that the operative cases that were packed with iodoform gauze invariably escaped the infection.

Several years ago I saw a case of placenta previa centralis in which I controlled the hemorrhage by packing. After I left, contrary to orders, the woman got up and started to do her ordinary household work, and promptly bled through. The attendant doctor did a Braxton-Hicks version, pulling the feet through. For some reason, this method did not control the bleeding, and he then attempted to do a rapid delivery and ruptured the uterus before I arrived. This one case of central placenta previa delivered with the Braxton-Hicks version rather made me avoid this method of delivery.

TRANSACTIONS OF THE SOCIETY OF THE ALUMNI OF THE SLOANE HOSPITAL FOR WOMEN.

Stated Meeting Held January 22, 1915.

The President, DR. GEO. W. KOSMAK, *in the Chair.*

DR. F. E. SONDERN (by invitation) read a paper on

LABORATORY AIDS IN OBSTETRICS.*

DISCUSSION.

DR. GEO. GRAY WARD, JR., in opening the discussion said: I have, of course, nothing to add to Dr. Sondern's very splendid exposition of the subject, except to express my hearty appreciation of his manner of stating it, so as to make clear to us a thing that has been complicated in the many discussions that we hear on the subject. I think Dr. Sondern's closing words in which he emphasized the fact that we must not forget the great value of that which we learn from our observations at the bedside and not rely entirely upon the laboratory findings, and to use them only as an adjunct, is one of the principal lessons that we get from his paper.

I was interested in the early part of his paper in the remarks which he made about the elimination of urotropin. I think we are very apt to give urotropin freely and suppose that we are getting aid from it and if you don't have the urine watched to see if it appears as formalin or urotropin, you really do not know whether it is doing any good or not. I have recently had a case of marked pyelitis, first on one side and then on the other, a pyelonephritis in fact, in which urotropin was given and in that case, although it was given in large doses, we could get no trace of it at all in the laboratory tests, either as formalin or urotropin. Finally after many weeks it did begin to show, but with the very faintest trace of formalin and I doubt if in that case we really got any benefit from the drug.

DR. O. P. HUMPSTONE, of Brooklyn, said: Dr. Sondern's remarks on toxemia of pregnancy brought to my mind the need for a laboratory guide which will render some aid as to the time when we must interfere.

I want to ask him about the acids, in the relationship of the three products found in the urine as indicative of the degree of toxemia that we may have to deal with in its damage to the organs. I mean acetons, diacetic acid and dioxidibutyric acid. My own experience

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* For original article see page 941.

with regard to these early pregnancy toxemias clinically is, that the minute we empty the uterus for severe toxemia the woman looks like a different person clinically and yet we have the laboratory signs continuing after it.

DR. HENRY P. DEFOREST, said: May I ask the reader of the paper when it is published to add to the very valuable material he has given us the tests for lactose and glucose and the tests for formalin and formaldehyde, as I think it will add materially to the value of the paper, at least to those of us who are not quite up to date in laboratory tests?

DR. F. E. SONDERN, in closing the discussion, said in answer to various questions: Administered urotropin usually appears in the urine either as urotropin or as formalin and proper conversion into the latter is essential, if therapeutic results are to follow. The tests applied to the urine are of two kinds. Those which demonstrate the presence of urotropin, or formalin, and those which are specific for formalin. The former are the more simple and the ones generally employed, such as Hehner's test, which is used as follows: Milk and the fluid to be tested are mixed together and stratified on sulphuric acid to which a few drops of ferric chloride have been added. If positive a deep violet ring will show at the junction of the fluids. This test is sensitive to dilutions up to 1 : 1,000,000, but does not differentiate between formalin and urotropin.

If beneficial results only follow the presence of formalin in the urine, then we should only use those tests which demonstrate this substance specifically. From those devised for this purpose I would recommend the one of Burnam as published in the AMERICAN JOURNAL OF OBSTETRICS AND DISEASES OF WOMEN AND CHILDREN, May, 1914, which is as follows: To the urine add three drops of ½ per cent. aqueous solution of phenylhydrazin hydrochlorate, three drops of 5 per cent. aqueous solution of sodium nitro-prusside, and one drop of a 40 per cent. solution of NaOH, which gives an intense blue color if 1 : 20,000 formalin is present, while a green color indicates a weaker dilution. Reagents must be freshly prepared.

It is generally stated that beneficial results are not obtained unless formalin appears in the urine in the proportion of at least 1 : 10,000 and my laboratory experience is that in spite of relatively full doses of urotropin we frequently find formalin in the urine in the proportion of 1 : 20,000 or even 1 : 30,000, and it is doubtful if any good can result from the presence of such small amounts. For this reason I believe it is desirable that such tests be made on specimens from patients taking urotropin.

With reference to the significance of evidences of an acidosis in cases of toxemia of pregnancy I do not believe that a single examination justifies a conclusion concerning the severity of the condition. Specimens are frequently seen in which pronounced evidences of an acidosis are present as shown by large amounts of acetone, diacetic acid and beta-oxybutyric acid and where the ammonia nitrogen is also decidedly increased, while in twenty-four hours the picture may have changed to such an extent that the specimen deviates but little from the normal. But, if specimens are examined at relatively frequent intervals and the evidences of an acidosis show constant increase, with constantly increasing fault in the nitrogen partition, this justifies the belief that the toxemia is increasing in severity. If this condition continues, these faults in the urine are followed by the appearance of an excess of urobilin and finally true bile pigment is found. When determining the point to which these faults in metabolism may be allowed to go, it is well to remember that the toxemia may continue for a considerable number of days after the uterus is emptied. I do not believe in a hard and fast rule concerning the point in faulty metabolism to which these patients should be allowed to go before the pregnancy is terminated. This decision should depend largely on bedside observation and may be influenced by the degree and the rapidity of development of the evidences of toxemia and also by the inability to influence these faults in metabolism by therapeutic means.

Dr. John O. Polak, of Brooklyn, N. Y. (by invitation) read a paper entitled

OBSERVATIONS ON 227 CASES OF ECTOPIC PREGNANCY.*

DISCUSSION.

Dr. Frank R. Oastler, in opening the discussion, said: We never have the pleasure of hearing Dr. Polak read a paper without getting something very interesting and extremely instructive. I think the paper which he has just read to us is one of the most interesting that I have heard him read for some time, particularly possibly because I myself have within recent months looked up some sixty-nine or seventy cases which I have operated in the last five years, to draw some conclusions with respect to the etiology and symptomatology.

With regard to Dr. Polak's treatment of the disease or the condition, I must say that my conclusions are very largely accord with those of Dr. Polak.

I was glad to hear him mention the fact that the diagnosis of ectopic gestation, generally speaking, is not difficult and if you watch your cases carefully the diagnosis should be made in a very large proportion of the cases. You don't make your diagnosis on one individual factor only. You have to take all the clinical appearances from beginning to end into consideration and sum them all up to make your diagnosis.

Dr. Polak mentioned the fact that the text-books emphasize the tragic ectopics and minimize the importance of the symptomatology of those ectopics which are not of the so-called tragic varieties. My experience has been the same as his. I very rarely see a tragic case of ectopic gestation. Nearly all of the cases I have operated

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* For original article see page 946.

on with the exception of possibly two or three, have been cases in which the symptomatology was not of the tragic variety.

In speaking of the etiology he divided it into three classes—one class in which there is a congenital condition of the tubes as the cause of the ectopic; a second class which follows frequent pregnancy; and the third class septic conditions. It doesn't seem to me that this really includes all the etiology of ectopics. It is very difficult, of course, to be sure you haven't some other congenital condition in the tube after you have removed it following an ectopic gestation, because it is so difficult to make your sections so as to absolutely exclude some other congenital condition. I feel reasonably sure that in a fairly good proportion of our ectopics there seems to be no definite reason why the ectopic should have occurred, and I believe that those are simply circumstances, happenings, as you may say, and when we take into consideration the various physiological processes that have to be undergone in the development of a pregnancy it is surprising that we get as many normal pregnancies as we do and it is simply a chance that this ovum has grafted itself on to a tube.

We should include therefore a fourth class in which there is no apparent pathological or clinical condition to be found. I think that bears very largely on the question of the removal of both tubes following the ectopic. Dr. Polak says he leaves the tube in if it is in an apparently healthy condition. How can we tell that from macroscopic evidences? It does not seem to me that we can. I have seen cases where one tube has been lying in the wall of another—a congenital condition. That cannot be determined macroscopically. I have seen a case where there was an ectopic in the rudimentary tube of the wall of an ectopic tube; in other words, the ectopic was in the rudimentary tube of a regular tube, showing that it isn't always possible to be able to tell whether the other tube is in normal condition. However, I agree with him most heartily in leaving the other tube in, if apparently healthy, and running that chance. I don't believe it is good policy to remove both tubes. It is a rare thing to have double ectopics. We get them to be sure, but in most of the cases there has been some preceding history of some sort of an infection. In cases where there has not been any preceding history of some sort of an infection I think you rarely ever find that you get a double ectopic, and in order to avoid a possible second ectopic it seems hardly fair to take out a normal tube and sterilize your patient.

I am also very glad to hear him mention a thing which I think is extremely important and that is in removing your tube not to interfere with the ovarian blood supply. I think to do that is a great mistake. I have seen lots of operators tie off the ovarian arteries in simply removing the tubes. I have also seen eminent operators in the last fifteen years when doing an ectopic take out the ovary on that side.

With regard to the local clinical manifestations in these difficult clinical cases or the less tragic cases: it has been my experience to note a fact that has been of value to me in making a differential diagnosis between septic conditions and ectopics, which is, as you know, sometimes a very difficult thing to do. It has been my experience to note that where you have septic conditions of the tubes or ovaries that nearly always you get some manifestation of retroversion or retroflexion of the uterus. In the ectopics in the number of cases that I have had under my care I find in a very large proportion that the uterus is not retroflexed but in its normal position. Whether it is of any value as a point in the differential diagnosis of a septic and ectopic condition I leave to you.

There is one other thing that Dr. Polak mentioned in these tragic cases. He said the best thing to do is to wait and I readily agree with him. I think that with immediate operation in these tragic cases you nearly always lose your patient. It is very much better to wait. I have personally never seen an ectopic bleed to death. Whether they do or not I am, of course, not prepared to say. I have seen a great many women who looked as though they were going to, but by following the procedure of putting them to bed as Dr. Polak mentioned, they have come out of their danger.

I don't agree with him in one respect, and that is as to the Murphy drip in these cases. I don't think there is any use of infusing them. I don't think there is any use of giving large amounts of water by rectum or hypodermoclysis, but I think that 500 c.c. by the Murphy drip and, say, repeating it in two hours and then repeating it again in two hours really aids them and does them a lot of good rather than not giving them any fluid or fluid by mouth as he has mentioned.

Dr. Frank R. Oastler, said: May I ask Dr. Polak one other question which I forgot to mention in my discussion and which it seems to me is important? Has it been his experience that in the history of these cases of ectopic, the patients have nearly always or, I may say, in a very large percentage of cases, skipped a period? I ask that because in the cases which I have been looking up I found thirty-eight out of possibly seventy cases in which no period had been skipped at all.

Dr. George G. Ward, Jr., said: I heartily agree with Dr. Polak in the conclusions. Hunter Robb made some experiments on dogs where he cut the ovarian arteries and made them bleed, but could not make them bleed to death. His work is very conclusive.

I think that it is by all means best to follow the line which Dr. Polak mentioned of not rushing into the abdomen and killing the patient as has been done very many times. By using delay and a little common sense these patients rally and then you are in position to operate on the rise of the patient's vital forces rather than when they are depressed and at the lowest ebb from the shock of intra-abdominal hemorrhage.

Hunter Robb brought out a point which I do not believe Dr. Polak mentioned. In his experiments he showed that a heavy sand-bag placed on the lower abdomen was of very great use in combating hemorrhage in these tragic cases. A heavy sand-bag, not too tightly filled, so the sand can disseminate itself and fit into the shape of the abdominal wall, is of distinct value as he proved by his experimental work on animals. Therefore in the cases that I have, I always make it a point to use it in conjunction with the Trendelenburg position and wait until the patient rallies before operating.

I echo what Dr. Oastler says about the infrequency of these cases of tragic ectopics. The last case I saw was two years ago. It happened to be an interstitial rupture in which the whole roof of the uterus was blown off. That case was operated on after a reasonable delay and made a good recovery.

Another point of interest is that in regard to taking off the other tube or leaving it. Richard Smith, of Grand Rapids, has studied that subject very thoroughly and written a very good paper on it, and he advocates removing the opposite tube and shows by his study of a large number of statistics that it is the best thing in the end for the patient owing to the frequency of repeated ectopic, but should only be done in those cases where further pregnancy is not desired or the patient is near the time of the menopause. Where there is a desire for children he advocates explaining the reason to the patient for removing the other tube and leaving it if the patient so desires. I had a case of ruptured ectopic only two or three days ago in which I took off the opposite tube although it looked normal. That woman was forty years of age and had several children and as she did not wish any more I took the tube off.

In the tragic cases it is not difficult to make a diagnosis, but we should be able to make a diagnosis in *nearly* every case. I confess I cannot do it in every instance. One of the chief troubles in my service is that I have a great number of Italians and East Side Jews and it is extremely difficult for me to get an accurate history out of many of those patients, and a correct history is necessary in order to make a diagnosis in the doubtful cases. I have had several interesting cases in the last few weeks. One case which came into my service gave a history of being nearly two and a half months over her time and she had had some pain generally. She did not localize it at all and she was having a little show of blood. On examination I found the uterus to be of the size that you would expect in a two and a half months' pregnancy. She was "spotting" and she had pain, but it was not violent pain. It looked as if she was pregnant and going to abort. We kept her in bed, gave morphine and watched her, but she did not abort. The cramps that she complained of did not amount to anything. They disappeared and we sent her home with instructions that if she should have further symptoms she should come back to the hospital. She came back in three or four days. She had absolutely no pain. On examination a thickening was found on one side and I still felt that she was pregnant and it seemed to me that the uterus was fixed in position and I came to the conclusion that she had some adhesions around the tube which were interfering with the development and prevented the uterus from rising out of the pelvis and that was going to make her abort. I opened the abdomen and found a small uterus behind an ovarian cyst. The cyst was exactly in front of the uterus and the uterus was adherent to the cyst. She had a ruptured ectopic and had been bleeding for some time without any pain. There was a quantity of blood in the abdomen.

I had another case the other day, which an assistant of mine in the clinic diagnosed as an ectopic. The patient was over her time and was "spotting" and had severe unilateral pain, very characteristic of ectopic. On examination the unilateral tender mass found was characteristic of an ectopic but it seemed to me that the uterus was entirely too large and soft and out of proportion. A diagnosis of probable pregnancy of two and a half months, associated with an ovarian cyst with a twisted pedicle was made, and it proved to be correct.

There is one point which I would like to mention in regard to delay in these cases. I had recently a case with a ruptured tubal abortion. There must have been over a quart of blood in the abdomen for at least a week or ten days. She walked in without complaining of any pain, only discomfort. She was not in a condition of collapse and although the pregnancy had ruptured into the abdomen and the abdomen was full of fluid blood she had been able to be about and do her work.

The point which Dr. Polak makes about the circulation of the ovary is one which I think is very valuable to those of us who are interested in technic. In Charles Norris' book on "Gonorrhea in Women," he shows the method of ligating the individual vessels running to the tube and of removing the tube without disturbing the ovarian circulation. I have been doing that for some time. I think it is a very important thing and prevents many a case of cystic ovary afterward.

DR. HENRY H. M. LYLE, in discussion, said: I would like to thank Dr. Polak for his very practical paper.

My experience at St. Luke's has been a little different. I think we see a larger percentage of so-called tragic cases. I had occasion today to look over the cases in our service in the last four years and there were seventy-eight in number. Seventy-seven of those were treated by immediate operation with no deaths. The other one was allowed to go. She came in on the private side and was seen in consultation with a gynecologist. He overruled the surgeon and the patient died. Personally, I know of three other deaths, one of which was a case of Dr. Gibson's, who saw the case outside and recommended transference to the hospital. They waited until the morning and the patient was dead. I have seen two other cases in consultation myself with the same result. With those figures confronting one, the proposition must be studied very closely. I think there are cases where it is too late to operate.

With regard to Hunter Robb's argument on the dog: I always thought that was very ridiculous for the simple reason that in veterinary surgery we know you can take a cow's ovary out at certain times without ligating the vessels, but you cannot when they are in rut, for if you do they will bleed to death.

Except for cases in the hands of good observers, it is rather unwise to advise delay and until I see the other side of it a little more clearly I must adhere to early operation. In other words, when you have a hemorrhage stop it. In my early experience I had a case upon which I did not operate but waited for reaction; she died from an embolic pneumonia.

Regarding the removal of the second tube: It is my practice to leave it except when there is an anomaly.

Dr. Otto Hoffman the former Sloane pathologist, called my attention to the different anomalies occurring in this class of tubes. Since then we see them not infrequently.

Dr. William H. W. Knipe, in discussion, said: I would like to ask Dr. Polak in how many cases the diagnosis was made definitely beforehand and also in how many of these cases some other diagnosis, especially of a chronic inflammatory condition, was made beforehand and ectopic was found accidentally, and also during this same period of time how many cases were diagnosed as ectopic before operation and turned out to be a chronic inflammatory condition, which, of course, would not be included in this series.

I am not so sanguine to believe that it is easy to make a diagnosis in many of these cases, especially where you have associated chronic inflammatory conditions, which, of course, are the cause of many of these ectopics. I know we have many incomplete abortions that come into us at Gouverneur where for a long time I cannot tell whether we are dealing with an ectopic or an incomplete abortion and we have made mistakes. We have had cases that rest in bed for a few days and they seem to get entirely well; then they go out of the hospital and come back, perhaps in two or three weeks, with more bleeding and more pain and at this time we can make a diagnosis of ectopic, whereas in the earlier weeks it was impossible to do so.

Then, again, I wonder how many of these cases appeared after a tubal abortion in the early weeks of pregnancy that gave little or no signs and simply had some bleeding with a little tenderness in the abdomen, or a little mass, not particularly definite perhaps, on one side or both sides. I have examined a lot of these cases and am always worried about them and we have had many cases where at first I have made a tentative diagnosis of ectopic and have waited and they have cleared up. We keep them in the hospital, as a rule, a sufficient length of time to get away from the possibility of there being an ectopic; but at times we find they will clear up and give us some symptoms later on.

I am quite sure that to give the impression that all these cases are easy to diagnose is a wrong one and I think all of us make mistakes and I have seen some of the best men make terrible mistakes in ectopics.

Dr. C. J. Kane, of Paterson, N. J., in discussion, said: I have enjoyed the discussion on ectopics very much this evening. In the old P. & S. Dr. Weir used to say, "Where there is pus evacuate." Ectopics, as we find them in so-called country practice, teach us, as Dr. Lyle has said, "Where there is hemorrhage stop it." I think that will sum up the whole situation without any further discussion.

Where there is hemorrhage from ectopic gestation it has been my practice to stop the hemorrhage if the case can stand an anesthetic at that time and not to wait until it is too late.

Dr. George W. Kosmak, in discussion, said: I would like to refer to a condition that came to my mind while Dr. Polak was dilating upon the varieties of ectopic and the subject already touched upon by Dr. Ward and now by Dr. Knipe and that is the question of tubal abortion. It seems to me the diagnosis in these cases is rather difficult. We make a preliminary bimanual examination and find on one side of the uterus or the other a mass. We have the clinical signs of an ectopic and get ready for operation and on opening the abdomen we find that in the meanwhile (perhaps due to our manipulative efforts or natural causes) a tubal abortion has taken place. We are not only dealing here with the difficulty of diagnosis if we happen to examine the patient after the abortion has taken place, but we also are dealing here, I think, with the difficulty in treatment. Sometimes the tubal abortion has occurred at a very early age of the pregnancy. The tube in other respects seems normal and we are in doubt as to whether to resect that tube or take it out in its entirety. I think that is sometimes a very delicate question.

In a personal experience only a few weeks ago I did an exploratory laparotomy. The woman was very certain that she hadn't skipped any periods. She only complained of slight pain in the side, irregular bleeding after her last period and a feeling of pelvic discomfort. In view of the uncertainty of the case I did an exploratory laparotomy and found a tubal rupture had taken place only a few hours previously.

I think we ought to explore in many of these doubtful cases more often than we do, especially in the ectopic cases. We have a history of irregular bleeding and irregular pain with only pelvic discomfort and we are apt to let them go until the symptoms clear up and let them get up and go about and find a rupture takes place. The facilities afforded us by modern operative methods should not deter us, I think, especially where we have facilities, from making a small opening and finding the true source of the trouble. A gynecologist in this city advocated some years ago doing an exploratory operation through the vagina and then determining the treatment. In my case in which I did an exploratory laparotomy I am very glad I didn't go in through the vagina because in every instance where there is a tubal abortion we get very large clots and tearing away of the tissues and this condition is often combined with other lesions which may make it necessary to open the abdomen very rapidly and we thus lose a lot of valuable time.

Dr. John O. Polak, in closing the discussion, said: I will take up Dr. Oastler's questions first as many of his questions include criticisms made by the speakers. I hope I did not give you the impression that the diagnosis of ectopic is easy. I said that in the analysis of this series of cases, hemorrhage and pain were present in over 98 per cent. and that where we fell down (and we did fall down in the diagnosis of a great many of these cases) we should not have fallen down had we interpreted intelligently what we found. That is the point. We all get away from the actual data in these cases and when we go over them we find that there was something that we missed entirely and yet it was right there. We felt it and had a definite history yet misinterpreted our findings. We find the history is very important and I agree with Dr. Ward that the most constant symptom is metrorrhagia. About 50 per cent. of them had skipped a period. The other cases were anomalous periods or postponed periods. Only about 50 per cent. had actually a period of amenorrhea. There is no question in my mind but that it is an impossibility to make a definite diagnosis in every case of ectopic but the more I see of them the more I am impressed by the house officers' ability to make a diagnosis on the face of the case, and another thing that has been impressed upon my mind (with some unfortunate results too) is this; cases that we have diagnosticated in the office as ectopics and sent to the hospital as such before operating upon them, if we would examine them under anesthesia all physical signs would disappear and we would send them back to the ward and the same afternoon we have an operation on an ectopic. The impression we get from the history and by talking to the patient and examining the patient face to face is often a better one than when you try to bring more careful methods to your aid.

In regard to taking off the other tube, Dr. Smith of Grand Rapids, in his paper, and Dr. Sampson, of Albany, in his limited experience, but extended work on ectopics, have made several definite contentions. Smith claims that the other tube should be taken off. Now certainly we have been able to follow a great many of these cases, for our services in Brooklyn are interlocking services and it is surprising how many cases we can follow. There are only six cases that we know of that have been operated on and I know two that Dr. Boldt has operated upon and that would make eight we have records of. This is in over 200 cases, so it is not a very frequent occurrence that the other tube is involved. Then again we have learned several other lessons. A recent case, a woman with an infantile uterus with one of those long tortuous tubes on the other side, which Smith calls attention to, sent me a postal card a few days ago to say that she had given birth to a baby.

A week ago we operated on a case of ectopic in the rudimentary horn of a uterus bicornis which ruptured accidentally. That case was kept twenty-four hours and yet the entire top of the horn was blown off. That case was very interesting. I wanted very much to have that specimen, and on looking over the history we found she had had a normal child in her developed horn. I did not care to take out her uterus. That tube seemed like a fairly good tube. Dr. Sampson would have advised a hysterectomy on that woman. With such a history, I believe that a woman at twenty-six years of age was entitled to some chance of future pregnancy.

The inflammatory cases there is no question about. I do not feel that in the large majority of cases we should take off the other tube, unless there is some evidence either in the history of previous inflammatory disease or in the actual gross pathology some lesion of that tube.

There is one other point which has been brought up and that is the immediate versus the postponed operation. This series of cases include both procedures and the recovery of our patients in the last few years has been better than it used to be. I do not operate as well as or as fast as I used to. The patients have been subjected to more procedure but we have been able to do better work by postponing them.

A colleague, whom I was trying to convert, brought a history of a case that occurred the other day in his service. He said this woman died. She was brought in pulseless, put in the Trendelenburg position and given morphine and the pulse came down to 110. The blood pressure rose to 110. It continued to rise to 115. It went to 120. It went to 125 and suddenly dropped to 80 and she died. That was a period of forty-eight hours. He did not get into that case at the time the patient was on the rise of her reaction. After she had pushed off her blood clot he did one other thing which a great many do, and that is he added fluid to increase the blood pressure and my objection to adding fluid, either by the Murphy drip or hypodermoclysis in the waiting period, is that these patients will get themselves together well enough to operate. The blood pressure will adjust itself, but by increasing the blood pressure in any way you certainly subject the patient to a greater risk, in my opinion. There is no question but that you can get away with an immediate operation, if you are as clever an operator as Dr. Lyle, better than you can with the deferred operation. In connection with the deferred operation, Simpson and Stellwagon have brought out that it is better for the patient under ordinary circumstances to wait for reaction unless she can fall into skilled hands. These patients are often shaken up pretty well by the ambulance. Their convalescence is disturbed very materially. If we give them a period of reaction, their convalescence seems to be better.

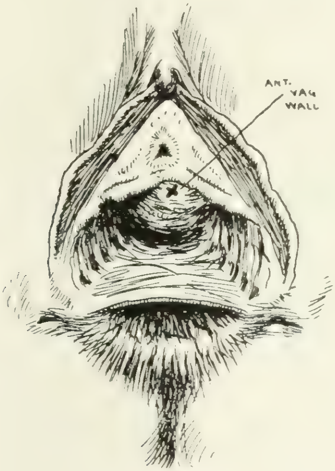
There is one other thing that I want to call attention to and that is we can control these cases of hemorrhage in the tragic stage by autocompression. I was very much impressed with Gauss' method of compression of the aorta and there is no doubt but that compression of the aorta by his procedure can be done, and I am waiting now to get one of these cases to use this apparatus on.

CORRESPONDENCE.

DIAGNOSIS OF EARLY PREGNANCY.

To the Editor:

A sign of pregnancy has been described by Labhardt in the *Zentralblatt für Gynäkologie*, 1914, xxxviii, p. 1017. He described as an original contribution the discovery of a sign of pregnancy occurring as early as the fourth or fifth week, even before, a livid discoloration of the vagina. It consisted of the presence of a band, livid in color, running from one lesser labium to the other in the region just below the urethral opening. He believed that it was due to the congestion of the numerous small vessels running between the bulbs of the vestibule on either side. These vessels lie directly beneath the mucous membrane and during the hyperemia incident to pregnancy, are first to show the congestion.



Jacquemin's spot.

I have no wish to cause a discussion over the priority of the discovery of this sign but I believe that it was discovered by a Frenchman, named Jacquemin, and was described in a text-book by Parent-Duchatelet, which was translated into German by von Becker in 1837. Kluge, Professor of Midwifery at Berlin, also described this sign after Jacquemin.

In a Study of 100 Cases of Early Pregnancy, I described Jacquemin's sign and drew attention to the spot below the urethra which was first congested as follows: "In this series of cases, it was found that this hypertrophy of the vessels and venous congestion of the vagina occurred first at a spot upon the anterior vaginal wall about 2 cm. below the orifice of the urethra. This spot later enlarged to spread the violet hue over all the vagina. This spot, called by the author Jacquemin's spot (Fig. 1), did not at first show upon the surface of the mucous membrane; as the membrane here has creases and crevices, the sign was seen as streaks of livid, bluish purple at the bottom of these furrows. The phenomenon may best be seen at its first appearance by separating the labia and stretching the mucous membrane of the anterior wall, so that these creases may be opened and the engorned veins exposed. As will be seen from the table, the sign was observed in 57 per cent. of the 100 cases before the thirteenth week. In 43 per cent. it was absent. It was absent in the very early weeks of pregnancy, present slightly from the seventh to the tenth week and commonly after the tenth week. As pregnancy advances, it is present in a greater proportion of cases and, after the thirteenth week, is a very reliable sign." (Ellice McDonald, M. D., Diagnosis of Early Pregnancy, AMERICAN JOURNAL OF OBSTETRICS, lvii, No. 3, 1908.)

This sign was also descirbed in my book entitled "Studies in Gynecology and Obstetrics." American Medical Publishing Company, New York, 1914.

This article was accompanied by numerous illustrations, the first of which accompanies this letter, and shows the point described by Labhardt and which I, wishing to give credit where credit is due, named "Jacquemin's Spot." My article was widely reviewed and was written to describe another sign of pregnancy which I believed to be really new and original with me.

German medical writers are very prone to criticize the carelessness of scientists in other countries in regard to questions of priority and reference, but I have found that, in regard to my own original contributions, wholesale borrowing without giving credit is so common that it has ceased to interest me. However, when it comes to seeing the credit taken from such a splendid obstetrician as Jacquemin, I feel that it should not pass unnoticed.

ELLICE MCDONALD.

REVIEWS.

Surgery of the Blood-vessels. By J. Shelton Horsley, M. D., F. A. C. S. Surgeon-in-charge of St. Elizabeth's Hospital, Richmond, Va.; a Founder and Fellow of the American College of Surgeons; Ex-President of the Richmond Academy of Medicine and Surgery; Member of the Southern Surgical and Gynecological Association, and so on. Pp. 304. Illustrated. St. Louis: C. V. Mosby Co., 1915.

This monograph deals with the various phases of blood-vessel surgery. The author first takes up the structure and histological repair of blood-vessels, the indications for blood-vessel suturing, and the history of blood-vessel surgery. He then describes the technic of the end to end suture of blood-vessels, in the development of which he has taken a prominent part. The essentials are: gentleness, perfect asepsis, the avoidance of any injury to the intima, and a suture made in such a manner as to bring intima surfaces together just as in suture of intestine peritoneal surfaces are apposed, the flange in the blood-vessel being turned outwardly instead of in as in suturing intestine. The interesting and original technic which has been developed by the author is explained minutely not only in regard to end-to-end suture but also to lateral suture of blood-vessels, transfusion, of suturing arteriovenous aneurisms, of making an Eck fistula, of transplantation of the anterior temporal artery, and of resection or transplantation of intestine after embolism of the mesenteric artery. Other subjects included are the treatment of hemorrhage, thrombosis and embolism, congenital nevi, varicose veins, and hemorrhoids. The work is one to be read with pleasure and benefit by every surgeon and by all who are interested in the advances made by American surgeons.

Infection and Immunity. A Text-book of Immunology and Serology for Students and Practitioners. By Charles E. Simon, B. A., M. D. Professor of Clinical Pathology and Experimental Medicine at the College of Physicians and Surgeons; Pathologist to the Union Protestant Infirmary and the Hospital for the Women of Maryland; Clinical Pathologist to the Mercy Hospital of Baltimore, Maryland. Third edition, revised and enlarged. Pp. 350. Illustrated. Lea and Febiger: Philadelphia and New York, 1915.

This work was originally written as an introduction to this fascinating and most intricate subject and as a guide to further reading, but, as new editions have been called for, so many details of technic have been added that it may now well serve as a textbook for systematic instruction on its subject.

In the present edition the recent advances in the study of Abderhalden's protective ferments and the associated technic have received detailed attention. The section on the Wassermann reaction has been almost entirely rewritten. Attention has been directed to the manner in which the danger from anaphylactic shock during serum treatment may be reduced to a minimum. Emphasis has been given to the important observation of Shick and his collaborators that it is possible through the aid of an allergic skin reaction to recognize those individuals whose blood normally contains a quantity of diphtheria antitoxin sufficient for purposes of protection. It is shown that by suitable technic more encouraging results may be obtained in the treatment of tetanus, after symptoms of the disease have once developed, than heretofore. The possibility is pointed out that by means of vaccine treatment Hodgkin's disease may be influenced. A bibliography is introduced where the student will find the more important references.

Materia Medica and Therapeutics. A Text-book for Nurses. By Linette A. Parker, B. Sc. (Col. Univ.), R. N. 12mo. Pp. 311. 3 plates and 29 illustrations in the text. Lea and Febiger: Philadelphia and New York, 1915.

This book, which is written for nurses only, gives the important and practical points which form a foundation for an intelligent handling of drugs, but not for prescribing them. The classification is by systems as the most practical from the nurse's point of view. In toxicology only the striking symptoms of poisoning are given, so as to be most easily remembered. First-aid treatments are emphasized. The book seems to be a very good one for its purpose.

Urinary Analysis and Diagnosis by Microscopical and Chemical Examination. By Louis Heitzmann, M. D., New York. Third revised and enlarged edition, with 131 illustrations, mostly original. Pp. 345. William Wood & Company, New York, 1915.

The keynote of Heitzmann's work is microscopic examination for diagnosis. Only seventy-seven of the 345 pages are devoted to the general and chemical examination, and only the simplest tests are described. The writer has, however, endeavored to bring these up to date in this revision. As in earlier editions he emphasizes the value of the study of the epithelia, using a high magnifying power. Low magnification is useless. He holds that by far the greater number of epithelial cells can be correctly located and valuable deductions made from their presence, both as to the situation and the chronicity of the lesion. In chronic lesions the deeper layers of epithelium are exposed and desquamated. Heitzmann's work stands quite alone in its attribution of preponderating importance to the study of the epithelia and in its detailed exposition of this subject. H. D.

BRIEF OF CURRENT LITERATURE.

OBSTETRICS.

Prognosis of Severe Hemorrhages in Pregnancy.—P. Ballard (*Arch. mens. d'obstet. et de gyn.*, Dec., 1914) says that when we have slow hemorrhages from the uterus the element of prognosis may be assisted by estimation of the cytological condition of the blood; comparison of the number of the red cells and the degree of reaction which marks the resistance gives the prognosis of the anemia present. In sudden and rapid hemorrhages there is little to guide us, and action is demanded so rapidly that we have little chance to make tests. The arterial tension will however, assist us in prognosis. Arterial tension does not depend entirely on the mass of the blood, but also on the rapidity of the circulation, energy of impulse of the heart, and the peripheral resistance. In examining the pressure it is not the maximum pressure, but the minimal that is important. A lowering of the minimal pressure, even if only transitory, will give reason for a very bad prognosis. Not only must every movement be interdicted, but as rapidly as possible blood mass must be supplied by intravenous injections and by transfusion. Thus we find in the study of arterial tension, and especially the minimum, a rational criterion for the gravity of hemorrhages of pregnancy or labor. The oscillimeter should be used to register this tension.

Labor in Pelves Deformed by Congenital Luxations of the Hip.—Pery and Balard (*Arch. mens. d'obst. et de gyn.*, Feb., 1915) finds that the pelvis of congenital luxation of the hip is not generally deformed. Many physicians fear a difficult delivery in such cases on account of deformity caused by changes in the position of the pelvis, but this is not likely. The pelvis is simply tilted forward, and the fetal head readily engages, and labor may even be precipitate. If the luxation is only on one side there may be some oblique contraction of the pelvis. The chief inconvenience is found when it becomes necessary to apply forceps to deliver. They can be inserted only perpendicularly. We need fear neither the lameness nor the luxation, but simply the atrophy of the corresponding side.

Analgesia and Anesthesia in Labor.—E. P. Davis (*Amer. Jour. Med. Sci.*, 1915, cxlix, 57) recommends during the first stage of labor thorough emptying of the bowel by hot, high enema, frequent emptying of the urinary bladder, the use of bromides by the mouth, quiet if possible, and comfort for the patient, if it can be secured; and should these measures fail and the patient be threatened with exhaustion from irritation, morphine and atropine should be given hypodermically. During the second stage of labor, when suffering predominates and uterine contractions are irregular, and evidently lessened by suffering, strychnine $\frac{1}{60}$ to $\frac{1}{30}$, digitalin $\frac{1}{50}$ to $\frac{1}{100}$, codein $\frac{1}{2}$ to $\frac{1}{4}$ grain together are given hypodermically. This dose may be repeated if necessary in an hour. When expulsion is imminent a small quantity of ether is inhaled at the height of a pain. At the moment of expulsion ether is given freely and quickly, producing a temporary anesthesia which soon passes by.

Operative Technic of Vaginal Cesarean Section.—Paul Bar (*Arch. mens. d'obstet. et de gyn.*, Jan., 1915) gives the technic of vaginal Cesarean section used in the Clinique Tarnier. He believes that the operation may be of great service in case abortion must be produced at once, incoercible vomiting, or cardiac asystole. It is less dangerous than dilatation of the cervix with Bossic's dilators, which lacerate the cervix. In primiparæ with narrow undilatable cervices the author prefers this operation to dilatation with Hegar's bougies. In late pregnancy it allows of delivery of a living child in cases of eclampsia in primiparæ. In such cases the moment of election is between eight and eight and a half months. He does not use it in placenta previa. The objects of vaginal Cesarean section are to make an opening in the lower segment of the uterus at a precise point and of sufficient length to allow the extraction of the ovum or fetus without injury, and which may be at once repaired. It may be done under general or local anesthesia. At the Clinique Tarnier novocaine-adrenalin solution is injected about the vulva, and at the junction of cervix and vagina. After eight to ten minutes anesthesia is complete. The resistance of the rectum is annulled by posterolateral incisions. The cervix is drawn down to the vulva, a lateral incision is made at the union of vagina and cervix, and the bladder separated from the cervix. The anterior lip of the cervix is incised through its walls into the uterus. In this the head appears. Little hemorrhage has occurred. After delivery of fetus and placenta the incisions are closed, and the uterus tamponned, for fifteen to twenty hours. The operation is made easy by this technic. Severe hemorrhage is rare when the infant is not large and the inferior segment is well formed. Care must be taken not to wound the bladder.

Immunity of Embryonic Tissues toward Grafts.—Salvatore Seaglione (*Ann. di ost. e gin.*, Feb. 28, 1915) states that there appears to be a special form of immunity of embryonic tissues toward grafts of any kind. This form of immunity is transitory and not specific, and is shown toward both embryonic tissues and newgrowths. The author studied this immunity at a month from the time of the insertion of the grafts. After opening the abdomens of female rats who were gravid and removing the embryos he pulverized them and introduced the material into the axilla of other rats. A growth remained surrounded by a connective-tissue stroma. The author made several series of experiments in male rats, in which he injected embryonic material in from one to three doses before grafting embryonic tissue into the rat. Control rats were also grafted which had received no previous injections. The author found a marked difference between the teratomata appearing in the injected rats and those of the controls. In the teratomata of the injected rats he found bone and cartilage. In the controls in addition to cartilage there were entodermic cysts, and also more complex forms; that is entodermic cysts lined with epithelium of cylindrical type, glandular masses, intestinal fragments, lymph nodules, and even striped muscular fibers. This difference he believes to be due to the injections practised on the first rats. This circumstance shows the greater resistance of bone and cartilage to absorption. The disappearance of the more complex structures is due to a cytolitic action and the invasion of elements of substitution. The nature of the cytolytic substance is difficult to define. According to Abderhalden, this lytic action is in relation with the elaboration and immission into the blood-vessels of so-called proteolytic ferments. Not only can these be transmitted from one animal to another, but their action may be exalted and reinforced by this transmission. Hence we may suppose that the cytolytic action of serum of rats four times injected with embryonic matter may be due to defensive ferments. This is at present not proven. But the author considers it is proven that these rats possess this power of increased action on the more complex, more differentiated elements found in experimental teratomata.

Presence and Significance of Colin in the Placental Tissues.—Cesare Decio (*Ann. di ost. e gin.*, Feb. 28, 1915) describes colin as a substance partaking of alcohol and amine, that is largely distributed in animal and vegetable life. It is found in the following organs of animals: watery extracts of the brain, cerebro-spinal fluid, especially when there is a degeneration of the nervous system, bile, intestinal extracts, thyroid, thymus, lymph glands, spleen, liver, pancreas, ovaries, kidneys, testicles, hypophysis, medulla of the bones, salivary glands, and sperm. The author describes experiments made to determine the amount of colin to be found in the placenta. He finds that the amount of colin to be found in the human placenta is gr. 0.007. That in the liver of the cow is 0.0055. It appears that the liver of the fetus and the human blood contain a quantity of colin much superior to that found in the liver of adult animals or in the blood of bovine animals. The significance of these results depends on the pharmacological action of colin. Colin has a depressing effect on the arterial pressure. Atropin is antagonistic to it in action. It increases the intestinal tone, and that of the uterus. The secretion of saliva, pancreas, lachrymal gland, and sweat is increased by its vaso-dilating action. On the blood colin acts to render it incoagulable, and determines morphological alterations, destruction of lymphocytes, and leucopenia, an action similar to that of the *x*-rays. Colin produces degeneration of the ovaries, ova, follicles, and cells of the theca. Colin is an antagonist of adrenalin. The cardiac action is accelerated and intensified by adrenalin, by colin the contractions are rendered weak and inefficient. Endovenous injection of colin produces diminution of glycogen in the liver, and frequently histological lesions of this organ. The author concludes that the finding of colin in any tissue is not a proof of its being there physiologically. If it is found in the suprarenals this is no proof that they elaborated it. Probably colin represents simply a product of derivation of phosphates, which show a great tendency to hydrolytic decomposition. The amount of colin that can be extracted from any organ is simply an indication of its richness in phosphorated lipoids. This is the case with the colin extracted from the placenta. The amount of colin that can be extracted from the fetal liver in proportion to that from the placenta indicates the presence in the fetus of a larger content of lipoids. From the blood of gravid animals may also be obtained more colin. Also in eclampsia more colin can be obtained from the blood, corresponding to the larger amount of lipoids in eclamptic blood.

Action of Mammary Extract on the Circulatory System.—Lorenzo Loredan (*Ann. di ost. e gin.*, Feb. 28, 1915) believes that so far no systematic study has been made of the effect of mammary extract on the circulatory system. The author therefore undertook such a systematic study, using the mammary extract of the cow. He injected the extract into dogs and rabbits in variable amounts, and studied its effect on the circulation. He was unable to observe any difference in the effects of the gland of gravid and nongravid animals. He found that it caused a hypotensive effect on the vessels; this may be the result of a direct effect on the vessels, or an indirect effect through the vasomotor centers. He found that the direct effect of the extract on the vessels was a constriction which began to show itself at a concentration of 0.5 per cent. or 0.1 of the gland per centimeter of physiological solution. With strong solutions the constriction, was more marked. The arteries of the uterus, heart and stomach were tested with extracts of the suprarenals, hypophysis, thyroid, and ovaries. Only the suprarenals caused the same constriction and in a less degree. For the uterus a stronger solution is necessary than for the other vessels. The hypotensive action of the extract on the vessels cannot be direct, for the constriction would cause a rise of pressure. Hence, it must cause a paralysis of the heart or act on the vasomotor centers in a manner antagonistic to that on the vessels. From further experiments the author concludes that there can be no antagonism between the local action on the vessels and the local action on the vasomotor centers. The effect may be annuled by a paralyzing action on the heart directly or through the nervous system. The gland then causes a notable constriction of the vessels accompanied by a lowering of the blood pressure.

GYNECOLOGY AND ABDOMINAL SURGERY.

X-ray Diagnosis in Gynecology with the Aid of Intrauterine Collargol Injections.—I. C. Rubin (*Surg., Gyn. and Obst.*, 1915, xx, 435) finds that a ten per cent. solution is necessary for a satisfactory uterine radiogram. Under mild pressure (*i.e.*, about 3 mm. of mercury) the injection is not attended by pain. It is desirable not to inject more than 5 cm. of the solution in the average case, especially in cases of sterility with so-called infantile uterus. The cases should be selected. One should make sure there is no active infection of the uterus or the tubes. Postabortive conditions with fever are contraindications. The method is safe as far as peritonitis is concerned even in these cases and in properly selected cases should be absolutely safe. There are no bad sequelæ; *i.e.*, no gross pelvic adhesions or exudates, as determined by bimanual palpation, have been found subsequent to the collargol injection. The menstrual cycle is not disturbed. The method is of aid (*a*) in the diagnosis of the patency or the occlusion of the tubes: (*b*) in differentiating intrauterine from extra-uterine tumors as intraligamentous cyst from myoma; (*c*) in certain malformations of the uterus and possibly also of the tubes; (*d*) in determining whether a single or bilateral salpingectomy had been done on a patient that had previously been operated; (*e*) in studying true flexions of the uterus and maldevelopments.

Kinetic Theory of Peritonitis.—J. W. Crile (*Surg., Gyn. and Obst.*, 1915, xx, 415) says that the leading symptoms of peritonitis are all adaptive phenomena for the purpose of defense against injury. We must conclude that death is caused by an excessive discharge of the body's store of energy in maintaining this defense. Our problem must be to discover some means by which the method of defense evolved by nature may be maintained while at the same time the energy of the body is conserved as far as possible. Two prime requisites in the treatment of peritonitis are: (*a*) the conservation of energy by the use of morphine, and (*b*) the maintenance of the water equilibrium by the Murphy rectal drip. Morphine not only protects the organs but it also aids in promoting the efficiency of the defense mechanism within the abdomen, for deep morphinization of itself causes inhibition of the intestine, immobilizes the patient as a whole, prevents pain, and holds metabolism practically at a standstill. Under deep morphinization but little food is required, the brain, suprarenals, and liver are protected, and the intestines are immobilized while the phagocytes overcome the infection. In cases of appendicitis with spreading peritonitis, the surgeon should never lose sight of this prime need of protecting the kinetic system from exhaustion. The administration of morphine should therefore begin at once. Nitrous oxide is the inhalation anesthetic of choice, as ether, by dissolving the lecithin in the phagocytes, causes a weakening of the body's defense, which may last from twenty to twenty-four hours—a break in the defense which may cost the life of the patient. The operation is performed under anoci-association, the local field being blocked as far as the zone of actual infection. Morphine is continued during and after operation, as is required to conserve the patient's energies.

Varicocele in the Female.—W. E. Fothergill (*Clin. Jour.*, Mar. 31, 1915) speaks of dull aching pain in the lower part of the abdomen as probably the commonest complaint of young women. Varicocele is often the cause of pain in the male, and it must be realized that it has the same effect in the female. Until recent years it has been usual to make a diagnosis of ovaritis in such cases. The diagnosis of varicocele in the female must be made by exclusion. If the pain is complained of in the absence of physical signs, and in the absence of any history of pelvic infection either septic or venereal, the case is simple. But this pain may be present together with other pelvic troubles, and when two or more conditions are combined a difficult problem may be presented. Ligature and excision of the bunches of dilated veins has frequently been tried during recent years. It is not easy to do it effectively, as the veins are very numerous and spread over a considerable area. A correct diagnosis and a good prognosis are the main therapeutic measures available in these cases. The nature of the condition should be explained, and the patient should be assured that the pain does not mean disease, and will have no serious outcome. She must be told that she will probably be troubled by her pain whenever she is run down or constipated, until the change of life gives her permanent relief. The use of a saline aperient every morning on waking should be advised, and a mixture containing cascara, strychnine and a little belladonna thrice daily when the pain is troublesome. The patient should not stand when she can sit, and should not sit when she can lie down. Exercise short of fatigue is of great value. Local treatment, such as douching, should be carefully avoided, as it increases the pain by increasing the blood supply of the pelvic organs.

Wassermann Test with Reference to Matrimony.—In a recent article E. L. Keyes, Jr., states that "a positive Wassermann does not probihit matrimony. W. J. Heimann (*Jour. A. M. A.*, 1915, lxiv, 1463) takes issue with this statement. He says that the Wassermann is negative at times in active syphilis, but only under definite and characteristic circumstances, and when this is understood, no confusion should arise. The Wassermann test may be positive in the absence of syphilis, in certain other diseases, and under certain conditions easy to recognize and exclude. With these exceptions the positive Wassermann indicates active lues. Clinical and experimental corroboration of this point of view exists, and thus assent to matrimony should be withheld from individuals with a positive Wassermann test.

Rare Type of Bladder Ulcer in Women.—G. L. Hunner (*Bost. Med. and Surg. Jour.*, 1915, clxxii, 660) reports a group of eight cases in women in which the lesion differs in many respects from the so-called Fenwick ulcer which has been the type heretofore designated as simple ulcer. The average age at onset was twenty years. In none of the histories could the cause for the bladder lesion be determined. These ulcers have all been found in the vertex or summit or free portion of the bladder; this being one important distinction in comparing the simple solitary ulcer of Fenwick which is found on the base or fixed portion of the bladder. A chief characteristic is the extremely slight mucous membrane change found in certain periods of the ulcer. The history is one of insidious onset without apparent antecedent cause, and long duration in spite of various forms of treatment. These cases under discussion have all had signs of chronic urethritis. Perhaps the most characteristic thing is the insignificance of the lesion as compared with the long duration and intensity of the patient's suffering. One's attention may first be arrested by the slight smooth white scars of former ulceration rather than by the slight hyperemia or inflammatory spots near these scars. In other cases there is a small granulation area which is bleeding from the distention of the bladder, or bleeds easily on being touched. In other cases or at other examinations of the same case the inflammatory spot is occupied and surrounded by an area of edema. There may be two or three granulation areas near together or somewhat separated. The urine presents a macroscopically normal appearance and the few leucocytes and red blood corpuscles present may be entirely overlooked with the microscope, unless care is used to settle or centrifugalize the specimen. A diagnosis of this peculiar form of bladder ulceration depends ultimately on its resistance to all ordinary forms of treatment. Excision through a suprapubic extraperitoneal incision is the treatment after one arrives at a diagnosis of this particular form of ulcer.

Sequence of Pathological Changes in Acute Appendicitis and Appendicular Peritonitis.—During the course of E. Mac D. Stanton's (*Amer. Jour. Med. Sci.*, 1915, cxlix, 524) study he has examined microscopically 539 appendices removed during or within ten days following an acute attack, and has studied the gross pathology of more than 1500 cases of appendicitis. He says that acute appendicitis is even during the first day of the attack a diffuse inflammatory process involving all coats of the appendix. The destructive process in the appendix reaches its height on the second and third days of the disease. From the third day on the subsequent changes occurring in the appendix itself have chiefly to do with the repair of the damage done during the earlier periods of the attack. The diffuse inflammatory process involving the walls of the appendix is of such character that even without gross evidences of perforation the protection of the general peritoneal cavity from infection depends upon the maintainance of the integrity of the fibrinous periappendicular adhesions rather than upon the bacterial impermeability of the walls of the appendix itself. Clinical perforation would almost never occur if the general practitioner and the laity would appreciate the fact that in appendicitis "purgation spells perforation" and withhold cathartics during the early stages of suspected cases. If in cases of diffuse peritonitis the peritoneal surfaces are put at rest by withholding food and cathartics by mouth the sequence of subsequent changes occurring in the involved area represents a definite and essentially uniform process tending to the resolution of the lesion or the formation of definitely circumscribed abscesses. After the first thirty-six to forty-eight hours of a diffuse peritoneal infection the lesions encountered are of such a character as to be essentially undrainable and not will suited to surgical interference, a condition which continues until the period of localized abscess formation.

DEPARTMENT OF PEDIATRICS.

TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS.

Meeting of February 11, 1915.

WALTER LESTER CARR, M. D., *in the Chair.*

DR. HENRY HEIMAN presented a case of

CONGENITAL TROPHIC DISTURBANCE.

DR. SARA WELT-KAKELS had shown a similar case at Dr. Jacobi's monthly meeting.

The patient, B. R., a female child, ten years of age, was admitted to Mount Sinai Hospital, September 23, 1914, in Dr. Koplik's wards during the summer service of Dr. Heiman. The family history of the patient was negative. She had had measles in childhood and had stumbled frequently while walking, from the age of two. The injuries received in these falls produced scars which were numerous on the elbows, knees, forehead, arms, and legs. Eleven days before her admission in September, she had fallen and injured her leg. The wound had been sutured. Seven days before admission the patient was seized with abdominal cramps, headache, vomiting, and her temperature rose to 104° F. At the time of her admission to the hospital she had fever, and examination of her cardiac condition showed a systolic murmur at the apex. She had a maculopapular eruption on portions of the body and on the palms of the hands and the soles of the feet. The lymph nodes were palpable; the extremities weak; knee-jerks were absent, and there were no other abnormal reflexes. There was a left inguinal hernia. The blood count showed white blood corpuscles 5800, polymorphonuclears 86 per cent., small leukocytes 10 per cent., large leukocytes 1 per cent., mononuclears 2 per cent., basophiles 1 per cent. Fundi negative; von Pirquet negative.

The child was also examined by Dr. Abrahamson, of the neurological service, who found an internal hydrocephalus, a tendency to pes cavus, facial asymmetry, weakness of the left hand, and a tendency to fall to the left. Dr. Abrahamson was of the opinion that the case was one of cerebellar diplegia with epileptiform tendency.

Dr. Heiman regarded the case as a congenital trophic disturbance with maldevelopment of the tendons, skin and muscles. When the skin was pulled it was elastic and rubber like. These cases have often been regarded as types of purpura, but have nothing in common with them. In Dr. Welt's case the father suffered from the same affection; in Dr. Heiman's case there was no familial tendency.

DERMATITIS BULLOSA HEREDITARIA.

Dr. Sara Welt-Kakels presented the case which had been shown at Dr. Jacobi's monthly meeting. The condition was similar to that described by Dr. Heiman. However, in this case there was a history of hemophilia in the child's father during childhood, which had disappeared by the time he reached adult life.

DISCUSSION OF CASES OF DR. HEIMAN AND DR. WELT-KAKELS.

Dr. Joseph Byrne stated that a case with the skin and muscle conditions just shown had recently been presented by Dr. Kennedy at the Neurological section. The man had traveled with Barnum and Bailey's Circus as the "Boneless Wonder." His skin had the peculiar rubber-like quality referred to. He had made a practice of pulling it and so was enabled to perform some remarkable feats such as pinching the skin of the forearm and raising it to a distance of 6 or 8 inches from its normal position. He also stated that when in training he could stretch the skin of the upper sternal region so that he could touch the forehead with it. In addition to the abnormal elasticity of the skin the patient exhibited marked hypotonia of the muscles of the legs, arms and fingers. This enabled him to perform the most weird contortions. Thus—standing with his back to the audience and keeping the right foot fixed he pivoted upon it until he faced the audience and with his right heel still pointing toward the audience, he knelt down on his right knee. The man had a defect in speech suggestive of paralysis of the soft palate. However, though there was no gross paralysis, the palate movements, *e.g.*, on a high note were clumsy and defective. The deep reflexes were said to be normal and if anything slightly exalted. There was some retardation mentally. There was no incoordination or assynergia but in crossing the knees he unquestionably exhibited the overaction so frequently seen in tabes and allied conditions. The question of bleeding was not raised but the man had recently undergone a suprapubic cystotomy. This would indicate that he was not a hemophiliac. Such a case, occurring in a man over forty, points to an unfavorable prognosis as regards the condition of the musculature and skin in the patients shown here to-night and it perhaps lends support to the favorable prognosis given by Dr. Welt-Kakels as to the hemophilia.

Dr. Heiman could not agree with Dr. Welt-Kakel's diagnosis of dermatitis bullosa hereditaria, as this was observed usually on the feet as they were exposed to friction and irritation causing blebs.

He did not believe that anybody could make a positive diagnosis at the present time. All that could be said was that these cases had trophic disturbances, causing congenital maldevelopment involving the tendons, skin and muscles. He had only presented the case because it was unusual.

CASES OF HEMOPHILIA, WITH REMARKS ON THE VALUE OF BLOOD TRANSFUSION IN THE TREATMENT OF HEMORRHAGIC DISEASES.

Dr. Edward W. Peterson presented these cases.

Case I.—This patient was a boy, six years of age, of Hebrew parentage. He gave a history of having had eczema in infancy. Some time ago he sustained a cut on the cheek which bled to such an extent that it was difficult to control. The boy came under Dr. Fowler's care for a cervical abscess. Simple incision of the abscess was followed by hemorrhage which lasted several days. He administered horse serum to which the child reacted badly. Dr. Fowler cautioned the parents not to allow any but human serum to be used if there should be any further occasion for the administration of a blood serum. Later, after the removal of a tooth, the boy again bled constantly for a week and was referred to Dr. Shamburg who tried every known means to control the bleeding, even to the actual cautery, without success. The child was then admitted to the Post-Graduate Hospital in a very serious condition with a grave degree of anemia. It was decided to do a transfusion immediately. They administered 400 c.c. of blood which was followed by remarkable improvement. The following day the hemorrhage recurred and continued for several days; then 200 c.c. of blood was transfused, this time from an outside donor. The hemorrhage stopped at once. For the first transfusion the father's blood was used as no other donor was immediately available.

Case II.—This patient was referred to Dr. Peterson, May 21, 1914, by Dr. O'Connell. She was six years of age and of Irish parentage. The family history showed that the father had suffered from profuse nose-bleeds when a young man. The child had had whooping-cough but no other illness. She had had a fall in May, 1913, one year before, which resulted in a nose injury, not very severe, but followed by rather severe epistaxis and ecchymosis of the nose and lower lids. After this the child frequently bled from the nose, but never so severely as to require special treatment for its control. On May 21, the epistaxis was so profuse that a physician was called and all attempts to stop the hemorrhage were unsuccessful. The child was sent to the Post-Graduate Hospital at about 10 P.M. and Dr. Peterson was asked to do a transfusion immediately. On the way to the hospital the child's condition was so critical it was thought she was dying. The mother was selected as the donor and a rapid transfusion of 325 c.c. was carried out. It was very striking to see the exsanguinated, apparently dying patient, promptly resuscitated. The pallor gave away to flush. The following day the hemorrhage recurred and the nares were plugged until the bleeding stopped. A succession of small hemorrhages occurred during the next two weeks. A foreign donor was selected and 270 c.c. of blood was again given, and again followed by wonderful temporary improvement. After about a week there was a recurrence of the bleeding tendency. In addition to the epistaxis there was bleeding from the gums, left ear, kidneys, bowels and vagina, as well as several subcutaneous hemorrhages. Horse serum, calcium lactate, etc., were given without effect. A third transfusion of 300 c.c. from the second donor had been followed by striking improvement. The tendency to excessive bleeding seemed for the time being to be checked.

Both of these cases seemed to be cases of true hemophilia; both showed severe posthemorrhagic anemia; in both the hemorrhages recurred; in both the bleeding tendency was overcome by blood from an outside donor. In such cases prophylactic doses of serum or blood should be administered every few months as in that way these children might be carried along, and it was well known that if one could tide over the period of puberty the tendency to bleeding decreased, and might disappear altogether at maturity.

Dr. Peterson quoted from Dr. Hartwell's article in the *New York Medical Journal*, November, 1914, in which he stated that while there might be danger in using blood transfusion without proper discrimination, in the conditions under consideration it had true worth. He also quoted Dr. Crile to the effect that blood transfusion was a life-saving procedure when performed in accordance with proper indications; that the transfusion of homologous blood was a procedure analogous to the transplantation of living tissue; that it was followed by a rise in the number of red blood cells and an increase in coagulability and in antibacterial qualities, and that it was indicated in severe hemorrhages of all types, certain anemias unaccompanied by hemorrhage, and certain toxic conditions. It was always indicated when the source of the hemorrhage could not be controlled or removed.

The plan followed was to take 20 to 80 c.c. of blood from the donor and at the same time 100 or 200 c.c. in order to get the serum that they might follow out Welch's method, that was 20 to 40 c.c. of the serum might be administered every six hours. If this failed they would have to resort to transfusion of whole blood. It was preferable, as indicated by the cases reported, to have a donor not related to the patient, and to use unaltered blood.

Dr. Godfrey R. Pisek said that his personal experience in hemophilia had shown that it was necessary to give the blood injections serially, that was, small doses at short intervals; this was true particularly in cases that had been previously repeatedly treated unsuccessfully by other methods. Freedom from the bleeding then followed.

Dr. Alfred F. Hess thought they should make a distinction between purpura and hemophilia. At present there seemed to be a great deal of confusion in discussing the two conditions. In hemophilia the striking fact was the lengthened coagulation time of the blood, while in purpura the coagulation time was almost normal. Again in purpura the platelet count was low; this was not the case in hemophilia. In every case one should examine the blood in reference to the coagulation time and the number of platelets before saying to which class of cases the one in question belonged.

The speaker was inclined to question whether in the case of the female child reported by Dr. Peterson the condition was that of hemophilia, as hemophilia was an exceedingly rare condition in the female; he felt inclined to consider this a case of purpura. The other case might also be one of purpura. The diagnoses were not based on a study of the pathological conditions.

Dr. Hess had seen a number of cases recently of both conditions. One child had been bleeding for five days. This case had been reported by Dr. Shannon; there was bleeding from the tongue itself in one case, and in another from the frenum of the tongue. He endeavored to control the bleeding by coagulose, fibrinogen, calcium, gallic acid and had finally succeeded in stopping it with the thromboplastic substance extracted from tissue. He had been working on this subject at the Research Laboratory and would be glad of the opportunity to try this preparation and would be grateful if physicians seeing these cases would refer them for this treatment or try it themselves in order to ascertain its value.

Dr. Peterson, in closing the discussion, did not argue the question as to whether the cases were cases of purpura or hemophilia. The patients were both in very serious condition, showing a high degree of anemia. Both Dr. Shamberg and Dr. Pisek had seen them and considered them hemophilia. It was known that only one case in every twelve of hemophilia occurred in a female, but nevertheless this case certainly looked like hemophilia. There had been profuse epistaxis for a year and then purpura as a late symptom. There was no question in the case of the boy. Almost from infancy he had shown a tendency to hemorrhage which was difficult to control.

THE USE OF BISMUTH PILLS IN THE FLUOROSCOPIC EXAMINATION OF THE INFANT'S STOMACH.

Dr. Alfred F. Hess said that about a year ago he had tried to measure the circumference of the pylorus in infants by means of the duodenal catheter. He had found that it was about 14 mm. in the new-born and about 18 mm. in infants a few months of age. A number of difficulties were met with and one could not make any arbitrary statements. He then thought that he would try making bismuth pills and by administering these and making a fluoroscopic examination be able to determine the pyloric diameter. He had bismuth subnitrate pills made and coated with keratin which would not dissolve in the stomach, but would dissolve in the intestines. The pills were made in the sizes 9, 15, and 21 French scale. He had expected that the small pill would pass through the pylorus first and the larger one second, but he found that the large pill passed first. The No. 15 would pass first, or both passed at the same time, but he never saw the smaller one pass first. He then had the pills made one-half bismuth and one-half licorice so that they would float in the stomach contents, but the same thing happened, the larger pill passing through the pylorus first. With the larger pill there was not more work for the stomach but less, while there was more work for the intestines. In using these pills the fluoroscope was the best instrument for observation. One could see the pill move along the greater curvature. When the child was placed on the left side the pill would go to the left, and when the child was turned to the right the pill would go to the right. If the child was turned up-side-down the pill would gravitate to the diaphragm. It was found that when the child was on the right side the pill left the stomach quickly, when on the left it went slowly. It seemed to him that this observation might be made use of in cases of retention or of pyloric relaxation.

Normally the pill left the stomach in from three to four hours; in some instances the time was a little longer. In cases of pylorospasm it required twelve to fourteen hours. Anesthesin had been given for the hypersensitiveness but it did not make much difference. Two centigrams of papaverin administered hypodermatically had proved more effective. In a dozen or more examinations he found that whereas in pylorospasm the pills required from twelve to fourteen hours ordinarily to leave the stomach after the administration of papaverin they passed in from three to four hours.

Dr. Hess gave a lantern demonstration of radiographs which had been made by Dr. Gottlieb, showing about ten plates. He showed a number of cases of pylorospasm and called special attention to the enormous dilatation of the stomach in some of these cases, and to the delay in the passage of the pills through the pylorus.

DISCUSSION ON DR. HESS' PAPER.

Dr. Charles Gottlieb said that this was an interesting method that Dr. Hess proposed to determine the motility and outline of the infant's stomach. It was easy to get the child to take the pills whereas it had been very difficult to administer the bismuth in suspension and when they took it they were liable to vomit the milk and spoil the picture. Even if they retained it so much gas resulted that it interfered with their observations. By giving the pills one could learn a great deal that was of interest in regard to the outline of the whole stomach. Dr. Gottlieb said that in his opinion Dr. Hess had introduced a very useful method for determining the motility and position of the infant's stomach.

Dr. William H. Stewart said that he had had no experience with the bismuth pills. It was well known that babies had a tendency to empty the stomach of a body of large caliber before one of smaller size; this was because the larger body caused the greater irritation. It did not seem to him that one could base any clinical observations of value on this fact. Certainly no accurate knowledge of the size of the pylorus could be obtained by this method. It had been his custom to give the bismuth meal by means of a catheter directly into the stomach. Their observations made when the bismuth had been given by the catheter had been of considerable value as the bismuth, in solution, gave a better opportunity of making accurate observations of the outline and motility of the stomach and he could not see that this proposed method offered any advantages.

Dr. Godfrey R. Pisek was interested in Dr. Hess' remarks particularly from the standpoint of determination of motility. He said he could hardly agree, however, as to the practical application of this method in infants. They seemed to have lost sight of the fact that with administration of a meal there always was distention of the stomach and that, on the other hand, with the pill they did not have distention and hence the conditions were not analogous. In his experiments with different fluids and semisolids, like farina, the motility of the stomach varied; it also varied with the composition of the food, *e.g.*, whether the percentage of fats was high or low. The motility of the stomach also varied when the bismuth was given with water alone or in combination with different foods. Dr. Pisek said he merely wished to caution them in this respect.

It did not seem to him that Dr. Hess had made clear whether the caliber of the pylorus corresponded to that of the duodenal tube which he believed was what the experiment set out to determine.

Dr. I. Seth Hirsch said that, though the knowledge of the exact size of the pyloric sphincter might be of value, still there was always another important factor to be reckoned with, namely, the expulsive power of the stomach.

Even if there was a slight narrowing of the opening it did not necessarily follow that the stomach could not empty itself within the normal time. Yet surely it was impossible to find this out with bismuth pills. The observations made with the administration of bismuth pills, were none of them new and all had been made before. It has long been known that, for instance, a larger body may pass through the pylorus faster than a smaller one because of the greater irritation which the larger body causes. It also has been a well-known and old observation that the pylorus may be emptied faster with the patient on the right side. It is a method, in fact, which every röntgenologist employs in attempting to fill the duodenum. It is impossible to infer anything from the administration of bismuth pills, excepting, perhaps, that pills are and will roll in the stomach. Surely no inferences regarding the form, outline, shape, tone, peristalsis can be made. It is an error to infer from the varied expulsion of such foreign bodies as bismuth pills that similar conditions occur after the administration of food.

For in normal digestion the fluid portions are expelled first and the solid portions later. In fact, one can administer water with the stomach filled with food and observe the peculiar phenomena of the water being passed rapidly into the duodenum while the larger particles of incompletely digested food are retained. The conclusion reached regarding the effects of papaverin is not a new one. This method was first suggested by Holzknecht more than three years ago for the purpose of differentiating the pyloric stenosis from pyloric spasm and it has been frequently tried in children. If a small dose of papaverin, say from one-fiftieth to one seventy-fifth of a grain, is given to a child with the bismuth meal in whom a previous examination showed a residue in the stomach at the end of four hours, which created the suspicion as to existence the of a pyloric stenosis, then if this stenosis was due to pure spasm, the stomach would be entirely empty four hours after the second meal plus drug, while, if due to stenosis, the residue would be larger than that found with the first meal. A note of warning must here be sounded regarding the fallacy of drawing inference from bismuth tests regarding the digestive time of certain foods in the stomach. Bismuth in the stomach when suspended in the food shows a tendency to rapid sedimentation and that sedimentation makes the bismuth a foreign body which is expelled more rapidly than the food within which it is suspended. If the bismuth, let us say, which has been suspended in milk is shown to have left the stomach it is not to be inferred that the gastric digestion of the milk has ended and the milk itself has been expelled. For, in some of these cases, one may insert a stomach tube and still withdraw milk. There is only one method, which, perhaps, is not liable to this error and by which the actual digestive time of the stomach may be determined. This is the method which was suggested by Kaestle of Munich for the purpose of studying the secretion in the adult stomach. Capsules of bismuth are used which are so made that one sinks to the bottom and the one floats on the surface of the fluid. By a serial röntgen examination of the patient, one can determine how rapidly and when the stomach is empty by the observation that the capsules reach the same level and that it is possible to roll them about in the stomach. In fact, numerous experiments with different purgatives and nutritive fluids have been made by this method.

CLOSING DISCUSSION ON DR. HESS' DEMONSTRATION.

Dr. Hess, in closing the discussion, said it was difficult to answer the remarks of some of the speakers, for, whereas Dr. Pisek had doubted whether the same results would be found to hold true where food instead of the bismuth pill was given to the infant, that is to say, whether the posture would have the same determining effect, Dr. Hirsch has stated that in adults it is an everyday fact that food rapidly leaves the stomach and enters the duodenum when the patient is placed upon the right side. It would seem that in view of the latter's exceptionally large experience in x-ray work, we must accept this statement and that we must feel Dr. Pisek's doubts will probably be found to have no substantial basis on fact.

The pills cannot be used to determine the diameter of the pylorus, but they are of value in the diagnosis of an obstruction at the pyloric orifice and they show this very much more sharply than when the bismuth mixture is given in milk, part of which frequently remains in the stomach, whereas the other part is seen in the intestine.

Dr. Abraham Zingher presented a paper on the

TREATMENT OF TOXIC SCARLET FEVER WITH THE FRESH BLOOD FROM CONVALESCENT PATIENTS.

The donors who furnished the blood were three to six weeks convalescent. The majority were tested with the Wassermann reaction to exclude syphilis, and were carefully examined for any evidence of tuberculosis.

He recommended the intramuscular injection of the blood; the method he employed consisted in inserting a medium-sized platinum needle (No. 18 gauge 1½ inches long) into the vein of the donor and with a 30-c.c. Record syringe rapidly aspirating from 8 to 12 ounces of blood, which is quickly injected into the muscles of the patient. The needle in the donor's vein is not removed, but a steel needle (No. 16 gauge 1½ inches long) is quickly attached to the syringe and the syringeful of blood is rapidly injected. In the meantime, an assistant attaches a smaller syringe containing some 1 per cent. sod. citrate to the needle in the donor's vein, to keep it free of blood. The large Record syringe used for obtaining the blood should be rinsed out once or twice during the transfer of the blood with a 1 per cent. solution of sod. citrate. In a child, a syringeful of blood is injected into each arm (triceps) and one into each thigh (vastus externus). In an adult, two such injections can be made into each arm and thigh. If larger quantities of blood are to be injected, the gluteal regions, the calves, and the deltoid muscles may be chosen.

The entire time consumed in the injection of 8 to 12 ounces of fresh convalescent blood need not exceed fifteen minutes. The injections are painless except for the temporary slight discomfort associated with the entrance of the needle. No local reaction follows and the blood mass appears to be rapidly absorbed, as indicated by the absence of any tumefaction, pain or induration at the end of twelve to sixteen hours. The muscles will be found to be supple and to have regained their former size and consistence.

Nine patients suffering from severe forms of toxic or septic scarlet fever were treated in this manner at the Willard Parker Hospital with amounts of convalescent blood varying from 3 to 8 ounces. In some of the patients there was a striking critical drop in temperature within twelve to twenty-four hours after the injection; there was also a distinct improvement in the pulse and general condition of the patient; the delirium in three of the cases cleared up very rapidly, and there was also a slight improvement in the exudate on tonsils and fauces. One patient treated with citrated blood (0.33 per cent. sod. citrate) from three convalescent donors showed a distinct improvement in the general condition, but the temperature continued for a few days, from a complicating streptococcus exudate. The remaining two patients died from the complicating advanced septic condition. Blood cultures in both showed the presence of a streptococcus. One of the two cases had received 2½ ounces, the other one 5 ounces of convalescent blood.

It seems, therefore, that in the later septic cases, where possibly the toxic scarlet fever element has disappeared from the clinical aspect of the case, these medium quantities of convalescent blood have much less action. Gland, joint and ear lesions are not influenced. We can, however, by using larger quantites of fresh normal blood, which may be readily obtained from the relatives of the patient, at times exert a distinctly beneficial effect on the disease, especially when the injections of 6 to 10 ounces of blood are repeated about three times at intervals of three to four days. These larger quantities of fresh blood, containing a considerable amount of natural antibodies, have been found to exert a beneficial effect in two of the worst septic cases admitted to the Willard Parker Hospital during the past three months.

Dr. Zingher said he hoped to be able to continue the work, using moderate quantities of convalescent blood (4 ounces in children, 8 ounces in adults) in the early and toxic cases, and larger and repeated injections of fresh normal blood, which can be more easily obtained, in the later and septic stages of the disease. By the end of spring he expects to have a larger number of treated cases, on which more definite conclusions as to the value of such treatment could be based.

The use of citrated convalescent blood (0.33 per cent. sod. citrate; obtained by adding to 2.5 c.c. of a 10 per cent. solution 75 c.c. of blood) will perhaps be a little more convenient to some and offers in addition the advantage of injecting the blood from several convalescent donors into one case. It enables one also to have a supply of convalescent blood on hand, which would make him less dependent on the constant presence of suitable donors in the hospital. Such citrated blood could also be shipped to distant places. The effect of the sodium citrate on the antibody content of the blood, however, will have to be more carefully determined; again, there is a tendency for the blood to deteriorate with time.

Reiss and Jungman, and R. Koch have used intravenous injections of large quantities of convalescent blood serum (50–100 c.c.) in toxic cases of scarlet fever. The temperature charts published in their reports show the same striking critical drop in temperature. In obtaining the serum, however, fully 60 per cent. of the convalescent blood is wasted, and it cannot be had in abundance, even at a time when scarlet fever is most prevalent. These authors have confined themselves to the use of blood taken at an early stage of convalescence (eighteenth to twenty-fourth day). It is quite possible that even two- to three-month convalescents can be used. In such a case the hospital authorities can keep a list of suitable donors, who are willing to be called on to furnish the requisite amount of blood for hospital or private patients in return for a proper consideration.

DISCUSSION ON DR. ZINGHER'S PAPER.

Dr. Matthias Nicoll, Jr., said that this idea of treatment was not new but that Dr. Zingher deserved credit for having invented a new technic in the giving of whole blood. The most promising field for its use is in the early toxic stages of the disease. He was not much impressed with the results thus far in the septic cases of scarlet fever with enlarged glands and discharge from the nose and mouth. Two cases of early toxic scarlet fever had convinced him that the use of convalescent blood was very efficacious. The effects of the injections were striking. The use of citrated blood in the one case he had observed produced little or no apparent effect, so that this procedure would seem to be largely restricted to hospital cases where convalescents could be obtained as donors.

Dr. William H. Park wished to say a word about citrated blood. He did not agree with Dr. Nicoll that ⅓ per cent. of sodium citrate prevented the action of the serum. There certainly was no evidence that antibodies were injured by such a small amount for such a period of time. As to the clinical results of Dr. Zingher's method of treating scarlet fever, his personal observations coincided with those of Dr. Zingher.

Dr. William Shannon had seen all the cases and his impression was that the serum had a decided effect upon the patients, indicated not only by a drop in the temperature and the character of the pulse but by the general condition of the patient. The results were less noticeable in the septic than in the toxic cases. In one case the temperature went down after twenty-four hours but the patient got worse; they gave a second dose of the serum and after twenty-four hours the patient showed a decided improvement and that patient appeared septic, but showed improvement after a second administration of the convalescent blood. Dr. Shannon said he did not regard the cases that had been reported as extremely toxic as those one sometimes saw. This plan of treatment was worth a more continued trial and observation of results.

Dr. Louis Fischer related the case of a child eighteen months of age with diphtheria of septic type. The child was admitted to the Willard Parker Hospital and treated in the usual way. The patient was septic with temperature of 105 and pulse of 180, later in the afternoon the pulse came down to 156. The case was complicated with suppurative pleurisy.

The prognosis was hopeless, the case was moribund, and as a last resort, 8 ounces of citrated blood was administered.

He was especially impressed with the rapidity with which the injection was made into the median basilic vein. He had always thought that this was a very difficult procedure as the vein was so small in a young child, but it was accomplished with remarkable facility in this instance. Within a few minutes the color of the cheeks improved, the lips and finger nails had a pinkish hue, and the cold extremities became warmer. The general cyanosis gradually disappeared. Three-quarters of an hour after the injection the pulse came down, and he thought the prognosis was more hopeful.

The simplicity of the technic will adapt this form of treatment to secondary anemias especially following malnutrition, resulting in marasmus.

Dr. Zingher in concluding the discussion, said that the paper was more in the nature of a simplified rapid method for the administration of fresh convalescent and fresh normal blood, rather than the drawing of any definite conclusions as to the value of such treatment. The results, however, were encouraging, and would seem to justify a continuation of the treatment.

The intramuscular injection of fresh whole blood taken from normal individuals, would suggest itself also as a convenient and readily applied procedure in the treatment of surgical hemorrhages, like those following tonsillectomy, in jaundice, in gastric and duodenal ulcers, typhoid ulcers, hemophilia, etc. Dr. Zingher treated a case of typhoid fever, complicated by diphtheria, in which there was constant oozing from the nasopharynx after the separation of the membrane. Five ounces of fresh whole blood injected intramuscularly promptly stopped the bleeding, whereas the previous use of horse serum had had no effect. He concluded by saying that he was glad to hear Dr. Edw. W. Peterson endorse the intramuscular injections of fresh blood in the treatment of hemophilia.

TRACHEOBRONCHIAL DIPHTHERIA AND ITS TREATMENT.

Dr. Henry Lowndes Lynah demonstrated his direct method of intubation. The instruments he employed were a small bivalve speculum and a small bronchoscope. He pointed out that the comparative measurements of the right and left bronchus in infants, children and adults was as follows:

	Infant, cm.	Child, cm.	Adult, cm.
Right bronchus......	1.5	2	2.5
Left bronchus.......	2.5	3	3.5

In children the bifurcation started at the third dorsal vertebra, in adults at the second. These anatomical differences, of course, had to be considered in performing the intubation. Dr. Lynah said that in laryngeal stenosis when he practised this method he always had the O'Dwyer set in readiness.

Dr. Lynah followed his demonstration by a lantern-slide exhibit showing direct views of the larynx in diphtheria and illustrations of cases in which the trachea and bronchi were covered with the diphtheritic membrane. Diphtheritic lesions in these localities had been passing unrecognized and were commonly taken for bronchopneumonia. The bronchoscope had demonstrated that it was quite possible and frequently happened that the diphtheritic membrane traveled downward from the larynx instead of upward. This method was applicable to the removal of foreign bodies or other obstructions as well as to diphtheritic membrane. He had used the method on a child of two weeks and upon a man eighty-seven years of age.

DISCUSSION ON DR. LYNAH'S PAPER.

DR. WILLIAM P. NORTHRUP said that Dr. Lynah's demonstration seemed to him to have opened a new chapter in the knowledge of diphtheria and the lesions it occasioned. On account of the lateness of the hour he would only say that he had worked with Dr. O'Dwyer in the dead house and what he had to say would be found with what Dr. O'Dwyer had said in Nothnagel's *System of Medicine*, vol. iv.

DR. SIDNEY YANKHAUER emphasized the advantages of direct method as demonstrated by Dr. Lynah. He said that where the larynx was involved the laryngoscope could be used; in the intratracheal cases he had used the uterine dilator and passed the stem in that way. The direct laryngoscope was of interest to the pediatrician and he ought to use it because it was the only method that could be used by the physician without assistance. It could be used in children as young as eight or ten months for the purpose of removing foreign bodies and there was no other method by which the larynx could be seen in such young children.

DR. GODFREY R. PISEK said he was impressed by the fact that this work was of distinct value to the pediatrician. What they had learned from Dr. Lynah should give them an impetus to study this type of cases and should impress upon them the importance of bearing in mind the possibility of tracheal and bronchial diphtheria as they might thus be able to save some cases that otherwise would be fatal. Dr. Pisek said that he had seen such cases with physical signs that indicated a blocking sometimes of the right, sometimes of the left bronchus—the collapse was so complete as to simulate fluid. A prompt diagnosis, removal of mechanical obstruction and intravenous injections offered some hope, as Dr. Lynah has been successful in a number of cases.

DR. WILLIAM H. PARK related the case of an adult who was admitted to the Willard Parker Hospital from another hospital and the members of the staff at both hospitals were undecided as to whether he had asthma or diphtheria. They waited eight hours at the Willard Parker Hospital and then gave antitoxin. Death ensued in a short time and it was supposed that he had died from serum sickness. An autopsy was done which showed a diphtheritic membrane beginning at the larynx and extending down into the bronchi. The conditions were such on admission to the Willard Parker Hospital that it would have been too late to have saved the man, but an examination by Dr. Lynah's method at the General Hospital would have revealed the condition at a time when life could have been saved. In the later subacute pneumonias one did not find the diphtheritic membrane.

DR. MATTHIAS NICOLL, JR., said that Dr. Lynah's work would speak for itself; he, however, had not done justice to the value of bronchoscopy as a means of saving life in tracheobronchial diphtheria. As a former pathologist at the Foundling Hospital he had seen a number of cases coming to autopsy in which the diphtheritic membrane extended even to the finest bronchi, but he did not recall such a case in which there was not also marked bronchopneumonia.

Dr. Lynah, in closing the discussion, said that out of twenty-seven cases of tracheobronchial diphtheria thirteen had died and fourteen recovered; nine of the thirteen died shortly after admission to the hospital and could not be considered as having any chance of recovery at the time of admission. If they could get these cases during the first two or three days they obtained very good results. They could not expect so much from the use of antitoxin in tracheobronchial diphtheria as death was rather the result of mechanical obstruction than of the diphtheria.

Meeting of March 11, 1915.

Walter Lester Carr, M. D., *in the Chair.*

A SIMPLE SYRINGE METHOD FOR THE TRANSFUSION OF CITRATED BLOOD IN CHILDREN.

Dr. Abraham Zingher demonstrated his method of transfusing citrated blood in children. He said that citrated blood in human transfusions was first practised in 1914 by Hustin, who injected in one instance a mixture of citrated blood and glucose. In December, 1914, Dr. R. Weil recommended the use of 1 per cent. sodium citrate. R. Lewisohn found that 0.2 per cent. sodium citrate would keep the blood fluid, and used that concentration successfully in a few human transfusions at Mount Sinai Hospital. The main part of the outfit consisted of two Record syringes, one 30 c.c. and one 10 c.c.; a platinum iridium or steel needle, 1½ inches long, No. 18 B. & S. gauge, with which the blood was obtained from the donor; a Goldenberg salvarsan needle for transfusing the blood into the patient; sterilized bottles for collecting the blood from the donor; a number of beakers for containing solutions of a 10 per cent. and 1 per cent. sterile solution of sodium citrate. Into each of several 100-c.c. bottles was placed 2.5 c.c. of the 10 per cent. solution of sodium citrate. A 1 per cent. solution was ready for rinsing out the syringe. After applying the tourniquet to the donor, the needle attached to the large Record syringe was inserted into the tense median cephalic vein, and a syringeful of blood quickly aspirated. The operator quickly detached the syringe and emptied the blood into one of the 100-c.c. bottles. The assistant kept the needle free of blood by attaching the smaller syringe and injecting a few drops of 1 per cent. solution of sodium citrate. Several syringefuls of blood could be obtained before it was necessary to rinse out the syringe with the 1 per cent. solution of sodium citrate. Seventy-five cubic centimeters of blood were put into each 100-c.c. bottle making the final dilution of sodium citrate 0.33 per cent. With each addition of blood the contents of the bottle must be rapidly shaken that the citrate might come into intimate contact with each amount of blood added. The blood was then aspirated from the bottles by a pipet and collected into a large beaker immersed in warm water to keep the contents at body temperature. The best vein for making the injection was usually the median cephalic. The next choice was the median basilic, or the external jugular. In older children the needle could be inserted through the skin directly into the vein. In very young children, and especially in infants, it was preferable and even necessary to expose the vein by a small incision.

By exposing the vein, one was certain that the needle for the transfusion was properly entering the vein, where it could be secured by a catgut or silk ligature. It was important not to overburden the patient's circulation with a relatively large amount of blood and it was therefore advisable not to inject more than 1 to 2½ ounces of blood in infants up to six months of age; 3 to 4 ounces up to one year, and 4 to 6 ounces up to two or three years of age. Where one desired to use noncitrated blood the technic could be followed along very similar lines though two assistants were needed.

The ease and simplicity of this method recommended it in a variety of medical and surgical conditions. The advantages claimed for the method were its simplicity, the rapidity with which the blood was obtained and citrated in several small containers, the complete control over the rapidity of the injection of the blood and the amount of blood injected, and the applicability of the method, even to very young infants.

Dr. Zingher said they had performed twelve transfusions by this method on young children at the Willard Parker Hospital, and one on a seven weeks' old infant, in which the median cephalic vein was used.

It was, of course, requisite that a donor free from tuberculosis and syphilis be chosen and that the serum of the donor should not agglutinate or hemolyze the patient's red blood cells, or *vice versa*.

DISCUSSION ON DR. ZINGHER'S DEMONSTRATION.

Dr. William H. Park wished to say that he had seen Dr. Zingher perform the removal and injection of blood by this method and everything went smoothly and quickly. The method was easy to master and was suitable for those who wished to inject blood in young children.

THE PATHOLOGY OF TUBERCULOSIS IN CHILDREN.

Dr. F. H. Bartlett read this paper which had been published in the *American Journal of Diseases of Children*, 1914, viii, p. 362, and reviewed in The American Journal of Obstetrics and Diseases of Children, March, 1915, p. 551.

THE TRANSMISSION OF TUBERCULOSIS IN CHILDHOOD.

Dr. William H. Park said that Rollett of Salsburg reported finding general miliary tuberculosis in an infant two days old. The mother died from miliary tuberculosis. Harbitz collected twenty cases in new-born infants in which the reports seemed reliable. Intrauterine infection occurred therefore occasionally, but accounted for a very small proportion of the tuberculosis of childhood. In most of these cases the mother had extensive miliary tuberculosis. Calmetti and others believed that there was no evidence that intrauterine infection ever proceeded from the father. This conclusion seemed well founded. A large amount of information on this subject had been gathered from cattle. Calves born of tuberculous cows were seldom infected when they were removed at birth from their parents and fed on milk from uninfected cows, or the milk rendered safe from tuberculosis by heating.

An enormous amount of investigation had definitely proven that both the bovine and human types of tubercle bacilli were capable of infecting human beings from infancy through childhood.

With reference to the occurrence of the bacilli in milk and milk products, it was well known that cows only contaminated milk extensively when they had disease of the udders. One or two cows with seriously diseased udders were capable of infecting the mixed milk of a whole herd.

It might be recalled that Dr. Hess in an investigation of the milk supply of New York City several years ago, found that 16 per cent. of the samples taken by him from the loose raw milk supply in the stores contained sufficient bacilli in small amounts to cause tuberculosis in guinea-pigs after subcutaneous injection. It should also be remembered that bacilli might enter the milk through indirect ways from infected cattle. At present the raw milk supply of New York City is small in amount and is entirely from tuberculin-tested herds and these tests, formerly made annually, are now made semiannually. If these tests were carried out carefully and no infected cows were brought into the herds, few or no tuberculous cattle would be present in the herds, and these would very seldom have any serious involvement.

During the past year less than 5 per cent. of the cows in the certified herds of Manhattan and Brooklyn had reacted, and on autopsy only about ½ per cent. of these reacting cows had more than a slight localized tuberculosis. Quite a large number of samples of milk from these herds had been injected into guinea-pigs without causing any infection. Although it was impossible to state that the milk from the certified cows under present conditions was absolutely free of tubercle bacilli, still they must be so few as to very rarely, if ever, cause infection. The only sure method of getting exact facts was to test out the type of bacilli in every infected infant or young child who was fed on raw milk. The Department of Health would be very glad to make these tests in any material submitted if the type of milk used and other information needed was given. The farms producing Grade A Raw Milk, which were not certified, were probably supplying a milk as nearly free from tubercle bacilli as the certified milk, though they had not been so thoroughly supervised.

A certain number of experiments seemed to indicate that the tubercle bacilli might survive a temperature of 140° F. for fifty minutes, but a more careful investigation showed that in these experiments the bacilli could not have been exposed to the required amount of heat for the specified time. It was safe to say that where tubercle bacilli contained in milk were actually heated to 140° F. and held at that temperature for twenty minutes they were destroyed. If any escaped they were too few to infect animals. The evidence that butter actually transmitted tuberculosis was less direct than in the case of milk. Whether meat from tuberculous animals had ever transmitted tuberculosis to human beings was a question of some doubt. When meat was thoroughly cooked, all the tubercle bacilli were certainly killed. The muscle of meat, as a matter of fact, rarely contained appreciable numbers of bacilli.

While recent investigations had definitely proven the bovine bacilli infected infants and to some extent older children, yet the evidence was equally clear that the majority of infections came from one human being to another. It was interesting to note that, as was the case in many other diseases, infants, as a rule, possessed a considerable insusceptibility to tuberculosis. The figures did not bear out Behring's suggestion uttered in 1903 that the origin of consumption was laid in infancy, remaining latent until something impaired resistance. Neither did our present knowledge agree with his belief that the original tubercle bacilli were usually of the bovine type. In the case of infants and young children, the greatest danger lay in being attended by a tuberculous mother or nurse. The bacilli might be transferred to the infant in many ways and might even be carried by the air on account of the breaking up of dried sputum carelessly expectorated or freed from handkerchiefs. The avoidance of this direct contamination could probably only be thoroughly maintained by the entire removal of the infant or child from contact with tuberculous persons. In some investigations that he had carried out it was found to a striking degree that the children of tuberculous parents were more infected with clinical tuberculosis than those living in families where no tuberculosis existed. This was in accord with the results obtained by many other investigators. The interesting question as to whether the infection producing the later manifestations took place in adults or was the development of an earlier infection had not yet been decided. If in this country adults did not become infected, it must be because they had developed immunity through having had an earlier infection or because they were naturally immune. They were certainly not yet in a position to be willing to subject children to infection with tubercle bacilli in order that they might have conferred on them a partial, or may be complete immunity. This interesting question of whether there was any way to safely protect from serious infection would undoubtedly be subjected to much study in the next few years.

THE RECOGNITION OF THE FACT AND THE ESTIMATION OF THE DANGER OF BOVINE TUBERCULOSIS.

Dr. Henry L. Coit, of Newark, N. J., had had no experience with nor experimental knowledge of bovine tuberculosis. Many physicians were latterly making diagnoses of bovine tuberculosis in a loose and thoughtless manner. If there is a lymphadenitis, an exudative peritonitis, or a bone lesion, the infection was assumed to be of the bovine type. This drift was unwise and unwarranted.

The difficulties of getting tuberculosis-free milk herds, the probability or improbability of infection through milk from herds where reasonable caution was exercised as to the health of the animals, and the hygiene of milk collections, were questions still unsettled because of a lack of definite experimental knowledge. The tuberculous reacting cow, possibly potential for danger, always has been and still was in the herds giving out milk supply but to what an extent she was a menace to the health of the child, or whether this danger was negligible they were only just beginning to determine. During its entire history as Medical Milk Commission so grave a problem had not been met as that of finding, in a well-guarded herd under Commission control, a large number of tuberculous reactors. This had accentuated interest in the medical control of milk intended for clinical purposes, and not only the profession but the public had been awakened to its importance. The specific revelation of a large number of reactors on a retest of a supervised herd had seemed to disturb the confidence of many people in the system. This was not just, because all milk herds when tested and retested at some time showed their respective percentages of reactors. The Milk Commission, through its sytem of safeguarding the milk by contract control of dairy hygiene, veterinary supervision, biological investigations, and medical inspections of employees, had imposed sixty-five requirements upon the dairymen only one of which in the present instance was called into question. Here it was not that the tuberculin test was not applied, but that its technic and the vigilant application of retests following the segregation of animals after the initial test was possibly defective. The facts thus far had shown that animals purchased in New York State were the chief offenders. For two years past many animals which did not react on the test before purchase did react in a few months in a well-guarded herd. This was presumptive evidence that they might have been rendered immune to the test by the surreptitious use of tuberculin before they were offered for sale. The Bureau of Animal Industry had estimated that at least 20 to 30 per cent. of all dairy cows in the United States were tuberculous. In view of this fact the real difficulty was that they could not enforce upon breeders and dealers in cows sold for dairy purposes the unfailing duty of burning a branding mark in the hides of animals whenever, upon the injection of tuberculin, they were found to be reactors. With this provision of law bovine tuberculosis could be as efficiently and quickly stamped out as was contagious pleuropneumonia a few years ago by the United States Government. The author related the history of the attempt of the Milk Commission to gain the cooperation of the United States Bureau of Animal Industry so that there could be no question raised as to the details of tuberculinization. It adopted a resolution requiring that the entire herd which had been found at fault should be tested again a third time within three months in order to remove any possible infection. It was thought that the Government could be prevailed upon to conduct this test with the use of Government tuberculin and that this would best protect the system of milk control from further criticism. The Government refused to grant this help to an organized philanthropy like the Medical Milk Commission though spending thousands of dollars every year in testing the cattle of private parties. The desultory testing of herds by the Government conferred but one-half the benefit which would be accomplished were such testing done in conjunction with the Milk Commission.

The success of the Medical Milk Commission during the past twenty-five years was a favorable comment on the practicability of the system. With the details of the system already worked out it only needed an organization with each individual performing his function with dispatch, precision, and regularity in order to make it invulnerable to attacks from those who had selfish and mercenary motives. The speaker, however, had no confidence in legislation as a means of solving this problem, neither had he confidence in the press as a means of bringing about a better state of things. In fact the press was the arch offender in promoting the designs of malevolent and double dealing enemies of philanthropic science, the unselfish principles of which were misunderstood and not appreciated by the public.

To meet the fact of bovine tuberculosis required:

1. Effective organization of the controlling agency which should consist of nonpolitical commissions with legislative authority, including in their membership medical, veterinary and sanitary authorities of recognized ability, their work to be financed by State funds. The Medical Milk Commission was the pioneer in this field. It had shown the way by laborious and gratuitous use of its time.

2. The fact should be met by dependable inspection and tuberculinization of the herds used for milking purposes by men of the grade of teachers in the veterinary schools, men of unassailable character.

3. It should be met by the invariable use of reliable tuberculin, such as that made in the laboratories of universities, or in State and Federal experiment stations.

4. Bovine tuberculosis should be met by instituting the custom among high-grade dairymen of breeding their own stock and thus avoiding the danger of replenishing their herds from miscellaneous lots of cattle, not free from tuberculosis, assembled by dealers.

5. The fact of bovine tuberculosis must be met by systematic tests of all animals before purchase and retests at regular stated periods, with the segregation of all which showed any suspicion of reaction. The technic of the United States Bureau of Animal Industry should be followed in making the tests, with the filing of a report of all tests and retests with the authority in charge of the work.

Dr. Coit expressed the opinion that, while he did not in the least minimize the importance of bovine infection in young children which according to Park and Krumweide was from 10 to 25 per cent. of those affected with tuberculosis or minimize the great importance of having milk herds absolutely free from reactors, yet he believed in the improbability of the frequent presence of live tubercle bacilli in milk from well-guarded herds in which good dairy hygiene was practised. This point was illustrated by the observations of Hess who in New York City a few years ago found the presence of the tubercle bacilli in but 16 per cent. of the milk sold by small dealers, while 84 per cent. of this low-grade milk contained no tubercle bacilli and gave no evidence of infectivity among the children behind the milk shops. The observations of Delphine in Manchester, Eng., gave a like percentage. It was demonstrated that actual tuberculosis of the udder was the definite cause of infecting milk in 78.8 per cent. If this could be true of market milks from dairies, the animals in which were not always properly tested with tuberculin, and in which cows with active tuberculosis were not always excluded, then logically the danger of milk drawn from tuberculin-tested herds, the animals of which showed no physical signs of disease of the respiratory or glandular system and with the practice of modern dairy methods, the probability of transfer of bovine tuberculosis through milk, was very small. The medical profession and the public were menaced by a bacillus far more vicious and virulent than the tubercle bacillus. Its name is Commercialism. The wonder is that the public and a part of the medical profession are so gullible and cannot interpret these trade practices or recognize their true character.

THE CARE OF THE TUBERCULOUS CHILD.

Dr. I. Ogden Woodruff said that the fact that they had such a title this evening showed the change in their ideas of tuberculosis in childhood in the last ten or fifteen years. A decade or more ago, aside from glandular and orthopedic manifestations of the disease, tuberculosis in childhood was looked upon as a disease seen but little outside of hospitals and one in which the discussion of treatment was of a value more academic than practical, and in which the chief interest centered in the difficulties of diagnosis, the clinical course and the pathological findings. The discoveries of the diagnostic reactions of Calmette and von Pirquet, the International Congress in Washington in 1908 and the organized work against tuberculosis had directed attention to the prevalence and frequency of tuberculous infection in early life.

The author confined himself more particularly to a consideration of the care of cases of the early and hopeful type and with prophylactic measures, emphasizing the point that the most important preliminary step was to make an accurate diagnosis, and that here familiarity with tuberculosis as seen in the adult was of little value in aiding one to detect the disease in the child. When it came to treatment they pinned their faith on the same trio, which were the mainstays in the adult, rest, fresh air, and superalimentation. It was perhaps rest which should be especially emphasized, since it was his impression that this factor was not generally given the attention it deserved. The fact that nutrition did not suffer to a serious extent in early tuberculosis in childhood, and readily responded when food was increased and the appetite stimulated by change in environment, the absence of fever (by mouth temperature) in early, and even moderately advanced cases, and the appearance of rapid improvement in general well-being which soon occurred in a child under treatment tended to throw one off his guard. The orthopedists had appreciated the importance of rest in bone and joint tuberculosis, and it was his experience that it was equally essential in pulmonary lesions. While the temperature did not seem to be affected in children by the toxemia, or by exercise, the pulse was particularly susceptible, and this he was accustomed to use to estimate the amount of exercise in which a child might with safety indulge. At the Bellevue Day Camp each child's pulse rate was taken daily and averaged monthly. The improvement in physical signs went hand in hand with the return of the pulse rate to normal. The pulse and temperature should be noted before exercise and one-half hour after it, and the work graduated according to its effects. Keeping the child mentally satisfied with quiet occupations was an important element of treatment at the day camps. Schooling, always in the fresh air, might be permitted, but he considered it preferable to limit it to three hours. Rest in the reclining posture was insisted on for one hour after the mid-day meal. For cases in a quiescent or apparently arrested stage, postural and breathing exercises exerted a marked benefit, as many tuberculous children had poor chest development and most atrocious posture, with the attendant lumbar lordosis and abdominal ptosis.

The value of the second of our trio, fresh air, was well established, and the nearer one could get to having it twenty-four hours the better. While it seems to be fresh air rather than the air of any particular locality an equable climate in which the temperature is fairly cool, with an absence of dust and high winds, was the most satisfactory. Excellent results, however, had been obtained with children in New York City, with only eight or ten hours daily spent under proper hygienic conditions. From the climatic standpoint the one particularly bad combination was heat and humidity.

As to diet, high calory foods were indicated until the weight was normal or slightly above it. At the Day Camp it had not been feasible to work out a diet on a scientific basis and Dr. Woodruff said he was not at all convinced of the necessity of planning such a diet. The tables that had been worked out were tables of averages and wide variations must be left for individual cases. The type of diet that seemed most suitable was the one that had been employed for years, namely, one high in fat and proteid. Digestive disturbances were less likely to occur if superalimentation was brought about slowly. If they did occur much valuable information might be obtained from a careful stool examination. Constipation should be avoided, and at the camp he had found digestive disturbances much less frequent since the routine weekly administration of castor oil. Care in regard to forced feeding should be exercised in hot weather, and on days of extreme heat and humidity it should be avoided altogether.

In the pulmonary cases he had used tuberculin only in those who did not tend to improve as they should under ordinary remedial measures. He could not say that he had seen any remarkable results; at the same time there were no untoward effects. Usually he had employed old tuberculin, in some cases bouillon filtrate. His initial dose was one one-hundred millionth of a gram, in some cases one-tenth of that amount. Doses were given twice a week and only to children who could be kept under observation. For three or four years he had been employing a scale of increase usually 25 per cent., which gave ten doses to a bottle, the way tuberculin solutions were usually prepared. Some children were very susceptible to tuberculin and it was not safe to ignore a local reaction when it occurred early in treatment. In cases of cervical gland tuberculosis he was distinctly enthusiastic over the use of tuberculin. There was a difference of opinion as to the desirability of surgical measures, Dr. Robert T. Morris had stated that he had not operated once for nonsuppurative glands in the last ten years, while Jopson deplored (*Archives of Pediatrics*, 1913) the conservative treatment of tuberculous adenitis. In all cases of tuberculous adenitis in which surgical measures were resorted to, great care should be exercised if caseation was present to avoid flooding the exposed tissues with tuberculous poison, thus setting up an intense tuberculin reaction which might light up an active focus elsewhere in the body.

Pneumothorax should be of value in some cases of children as it was in some adults. Vogt and Pielstieker claimed that it could be used with benefit in very young children.

Among minor remedial measures the hygiene of the mouth, nose, and throat was important. Adenoids should be removed when the disease was quiescent or apparently arrested; if the tonsils were hypertrophic they should be removed, but at a later date as they required a longer anesthesia.

As to when the tuberculous child should resume his normal life, in a general way it might be said when the pulmonary signs had entirely disappeared, or remained stationary, or inactive, for a period of months; when the nutrition was normal, the pulse normal in rate and range and of good stability, and when various physical defects had been removed. There was too great a tendency to permit children with tuberculosis to return to their normal environments and habits, simply because their general condition was good, though the signs in their chests were well marked.

Dr. Woodruff said he was opposed to the administrative management which permitted tuberculous children in an active or quiescent state to attend school in ordinary class rooms, if they had no tubercle bacilli in their sputum.

With regard to the after-care of the tuberculous child, the fresh air class was the best avenue by which a child might return to its normal life. A cured case should sleep constantly with the window open, or if practical, out of doors. Each child should be discharged on probation, and at first should report once a month for examination; later the period could be lengthened, if his health remained good. These children should be especially guarded against whooping-cough and measles, and any cold or infection of the respiratory tract should be treated as a serious disease, and the child kept in bed until the symptoms disappear.

In speaking of prophylaxis, the author said he was inclined to agree with McCleave who said that of the strife against tuberculosis in adults, much of the effort and money was "wasted, until it was directed to basic preventive work among children." Of the two sources of infection, bovine and human, the former had been thoroughly discussed, and with regard to the latter their aims were twofold, (1) to prevent the entrance of infection, and (2) with infection once present, to localize it and to prevent its extension and development that a child so infected might be brought up to adolescence with the greatest possible resistance against the disease. These constituted, in fact, but one problem. They must aim first to prevent too intimate contact with the infected member or members of the family, and to reduce the amount of the infectious material in the home to the minimum. The necessity of excluding young children from the bed-room or other room habitually frequented by a tuberculous person should be emphasized. The need of sanitary furnishings and methods of cleaning must also be emphasized, together with the advisability of sending children from such an environment to prenentoria at intervals, and educating them in cleanliness and hygiene.

The children thus exposed should be built up, nutrition improved, various physical defects corrected, and special hygienic care bestowed on the nose and throat. Open-air classes were another factor in improving the health of the subnormal child. Apparently healthy children exposed to tuberculosis should be seen by their physician at least once in six months. All exposed children should have a cutaneous test on their first examination, and all children born into tuberculous families under medical supervision, should be tested soon after birth. Children thus exposed should be tested every four to six months. Such children under three or four years of age who reacted to the tuberculin test were in need of medical care on the ground that in them the foci were usually active. It was not logical to assume that any child under observation, who, previously inactive, suddenly reacted, was similarly in need of special care on the ground that its foci of infection was active and not yet properly circumscribed. The question of the benefit of tuberculin treatment for young children showing a positive reaction was not yet determined.

The care of children under four years of age who reacted to tuberculin was still a serious problem in municipal work. Some provision had been made for such children at Farmingdale. At this age the children were too young to go to a day camp and were compelled to remain at home in the environment in which they acquired their infection. The accomplishment of results with such children was no easy task.

DISCUSSION ON PAPERS ON TUBERCULOSIS.

Dr. L. Emmett Holt was interested in what Dr. Coit had said regarding the prevention of tuberculosis among cattle. It was well known that contact played a large part in the dissemination of the disease. This was even more true among cattle than among human beings as contact was closer. Dr. Coit had spoken of the cows that were "plugged" with tuberculin by dealers when they were sold. Under existing conditions it seemed almost impossible to keep tuberculosis out so long as dairymen continued to introduce new animals into the herd at frequent intervals. In this connection the importance of dairy farms breeding their own cattle for the purposes of replenishing their herds rather than depending on outside sources should be emphasized. This was especially important in view of the fact that cows were so often tuberculous though appearing in good condition. This was true also of many children with tuberculous lesions; if digestion and assimilation were good, they might gain steadily in weight at the same time the disease might be progressive.

Dr. Holt would like to have Dr. Woodruff tell them what was the relative success obtained in New York with open-air window classes.

Dr. Robert Langley Porter, of San Francisco, Cal., called attention to the fact that there were conditions in which there were nontuberculous lesions of the lungs in young children and that the subject should not be discussed without taking this fact into consideration. In connection with what had been said regarding bovine tuberculosis, it was interesting to observe that in the State of California it was said that 33 per cent. of the cattle had tuberculosis, and here the cattle were not housed as in the East but lived in the open and yet infection took place as readily as when the cattle were kept in stables. In spite of this large proportion of tuberculous cattle there was no corresponding large proportion of tuberculous infections among children under fourteen years of age (the estimate being 7 to 9 per cent. bovine), and he felt that the great danger was in transmission from one human being to another human being.

It seemed to him that there were two things to be impressed. First, the necessity of minimizing the danger of infection through human contact and especially from the carriers so often found in the home. Such carriers were frequently the grandparents, who complaining of asthma or winter cold, etc., nearly always had tuberculosis. The second point to be emphasized was that they should not assume a child to be tuberculous when that was not the case as there were so many nontuberculous lung infections.

Dr. Charles R. L. Putnam said, in response to a request to speak on bone tuberculosis, that he did not have much to say on that subject, but he wished to speak of mesenteric tuberculosis. They had for years in all abdominal cases in children examined the mesenteric glands to find how common relatively tuberculosis was in the mesenteric lymph nodes and the lungs. The lungs might be badly affected and yet the child be free from tuberculous peritonitis and this apparently showed that the tubercle bacilli could enter and pass through the mesenteric glands without producing permanent lesions of the mesentery or intestine. The infection might even be transmitted to the meninges and yet the peritoneum not be affected.

Dr. Putnam asked whether the tuberculin test detected both human and bovine tuberculosis when applied to cattle.

Dr. Maurice Fishberg was surprised that in a discussion on bovine tuberculosis in children the problems of immunity were not touched upon. Recent experimental investigations have shown conclusively that reinfection is difficult or even impossible in tuberculosis. Clinically it appears that the human being also was immune to reinfection with tubercle bacilli. This is evident from the fact that physicians, nurses, orderlies, etc., in hospitals for consumptives have never been known to be infected with the disease; similarly, marital infection is a negligible factor in the dissemination of phthisis. In his experience among the poorer strata of the population of this city it was exceedingly rare that a phthisical husband should infect his wife, or that a phthisical wife should infect her husband. The explanation for this curious phenomenon is that everybody has been infected with tuberculosis before reaching adolescence, immaterial whether phthisis is developed or not. Inasmuch as reinfection is impossible, the physicians and nurses in sanatoria, and the nonphthisical consort of a consumptive, are immune.

Dr. Fishberg pointed out the rarity of *phthisis* in children. In infants hematogenous tuberculosis, tuberculous bronchopneumonia, meningitis, etc., are frequent to be sure. But in children between three and twelve years of age pulmonary tuberculosis of the types we see in adults is very rare. He sees a case now and then, but they are rare. Authorities are in agreement on this subject. Dr. Holt, in his book on "Diseases of Children," also says that pulmonary tuberculosis is rare in children under ten years of age. Tracheobronchial adenitis is quite common at this period, but this is not phthisis.

It has recently been suggested that tuberculosis in children, especially of the glands, is due in a large proportion of cases to the bovine type of tubercle bacilli, and that in a large proportion of cases this bovine infection is not followed by phthisis immediately or in later life. Indeed, some have even ventured to assert that bovine infection during the first decenium of life is an important immunizing agent, preventing reinfection with bacilli of the human type. This is a fascinating subject, and sufficiently important for investigation that he would suggest to Dr. Park, who has all the facilities and opportunities for such an investigation, to undertake it. It may throw some new light on the problems of infection.

With reference to Dr. Bartlett's statement that a large proportion of infections among the 178 cases studied at the Babies' Hospital seemed to be due to inhalation, since the lesions in the lungs appeared to be primary, Dr. Fishberg stated that this is not in agreement with the modern view of infection of infants. A large proportion of these infants were partly or altogether brought up on cows' milk, and it may have been bovine infection by ingestion. Even if the bacilli are brought into the child's mouth with the inspired air, they may be swallowed. At the autopsy it is exceedingly difficult to decide which was the primary lesion. Experiments by Ravenel, Calmette and others have shown that bacilli ingested may pass through the unbroken mucous membrane of the gastrointestinal tract and carried by the lymphatics to the lungs where they produce a lesion. The hypothesis of infection through the inhalation of dried sputum has of late received some severe shocks, and it is doubtful whether it will hold out the test of recent research.

DISCUSSION ON DR. BARTLETT'S PAPER.

DR. HENRY L. COIT said that Dr. Bartlett's statement that the large proportion of infections among the 178 cases studied at the Babies' Hospital seemed to be due to inhalation since the lesions in the lung seemed to be primary was interesting in contrast to the belief that tuberculosis in infants was due to infection through ingestion of the bacilli as when the tuberculous mother handles the child, and the breast with her soiled fingers. This question whether the tubercle bacilli are introduced through the lung or through the intestine ought to be cleared up. Ravenel fed a cat tubercle bacilli and produced infiltration of the bronchial lymph nodes, so it seemed that the bacilli could pass through the intestines and mesentery without producing changes in these tissues and yet be swept through the blood and lymph channels to the lungs there to do damage. It had always been his impression that infection occurred by ingestion oftener than by inhalation.

DISCUSSION ON PAPERS ON TUBERCULOSIS.

DR. F. H. BARTLETT said, in reference to the inhalation and ingestion origin of tuberculosis, that after finding the primary lesion in the lungs and bronchial lymph nodes in 134 of the 178 cases it would be a far cry to assume that the bacilli passed through the intestines to the bronchi. They had found the primary lesion in the mesenteric lymph nodes in only seventeen instances and it seemed fair to attribute these to ingestion. The difficulty lay in proving positively which focus was the oldest tuberculous lesion. But assuming that in 134 cases this was in the lungs and bronchial glands, we believe that the bacilli gained entrance there by inhalation rather than by ingestion. From the statement of the case it seemed evident that the inhalation origin was the most common mode of infection.

DR. WILLIAM H. PARK, in closing the discussion, said he was surprised at Dr. Fishberg's statement in reference to marital infection with tuberculosis. Several investigators of this subject had found reason to believe that infection did at times take place; it seemed that they all must have seen instances in which one member of a family after another had returned home to take care of those of their number suffering from tuberculosis, and had become infected. It might, of course, be argued that the care and mental depression attendant on such an experience might bring out an early infection that had been dormant. He thought Dr. Coit was extreme in his requirement that only those of the standing of a professor in veterinary medicine should be permitted to take temperatures; the physician was in the habit of allowing the trained nurse to take temperatures. Of course, the men who took the temperatures should be well trained and honest.

As to the relative amount of bovine and human infection, while it had been proven that bovine bacilli did infect infants and children yet it seemed equally clear that the great majority of infections in man were transmitted from one human being to another. In cases of fatal bovine infection in which there was a general tuberculosis there was, as a rule, no way of determining the type of bacilli causing the lesions; the bovine type was like the human in extent and appearance.

As to the question whether the tuberculin test detected both human and bovine tuberculosis in cattle—the tuberculin test would reveal either type of infection, but as a matter of fact one never found human tuberculosis in cattle unless the cattle were experimentally inoculated with the human tubercle bacilli.

DR. HENRY L. COIT had it from a veterinary practitioner that the rank and file of veterinarians were not high grade in ability or reliability. Still they had been employed to make inspections and apply the tuberculin test. He believed that as a proper safeguard to the milk supply that they should employ men of the grade of professor in a veterinary school that they might make sure of having men of ability, character and reliability.

DR. I. OGDEN WOODRUFF, in closing the discussion, said that as to the relative value of the open-air and open-window classes, he thought it was a question of climate and equipment and of the amount of money that could be expended on equipment. In New York the open-window classes were conducted in rooms in which the windows were pivoted on two sides and the air was practically the same as the outside air, or just enough heat was provided to give a temperature of 40° F. In his opinion this arrangement had certain advantages over the open-air classes. The excessive humidity and high winds in this climate took a large amount of bodily heat and some protection from the high winds was an advantage unless the children were well equipped with warm clothing.

With the present equipment provided by the city the children were too cold out of doors. In some private schools the children were entirely outdoors and seemed to do well, but here they were better protected against the cold by warm clothing. Another point had to be considered in the open-air class and that was proper protection from the sun. The roof should be double or so constructed that it would give adequate protection against the sun in the summer. The open-air plan was apt to prove too cold in winter and too hot in summer, and with the present equipment he preferred the open-window plan.

REVIEWS.

A Manual of Diseases of Infants and Children. By John Ruhrah, M. D., Professor of Diseases of Children at the College of Physicians and Surgeons at Baltimore, Maryland. Fourth edition. 12mo. volume of 552 pages, 175 illustrations. Philadelphia and London: W. B. Saunders Company, 1915. Cloth, $2.50, net.

The fourth edition of this very popular and practical little book contains a number of minor changes and additions, among which may be mentioned an article on pellagra in children, the use of the soy bean and some other methods in the section on infant feeding, a chapter on drug eruptions, and a full account of the Binet-Simon test for the mentality of children. The author has succeeded well in keeping the book small so that the student may use it for rapid reference in the wards or clinic and the practising physician may find it useful as a desk book.

BRIEF OF CURRENT LITERATURE.

DISEASES OF CHILDREN.

Lange Gold Chloride Reaction on the Cerebrospinal Fluid of Infants and Young Children.—C. G. Grulee and A. M. Moody (*Amer. Jour. Dis. Child.*, 1915, ix, 17) describe the technic of the Lange gold chloride reaction and their findings in congenital syphilis, tuberculous meningitis and other conditions. In the eighteen cases of congenital syphilis included in this report the cerebrospinal fluid reacted to the colloidal gold chloride solution always in the lower dilutions, and with a marked degree of regularity strongest in the dilutions of 1:40 and 1:80. There is a small group of cases of congenital syphilis in which the reaction is similar to that of paretic dementia. The reaction as obtained in congenital syphilis is most nearly approached by those conditions which show a slight inflammation of the meninges or brain and are not likely to be confused clinically with syphilis. The reaction in tuberculous meningitis is found to be most intense in the dilutions of 1 : 160 and 1 : 320. It is likely that the more rapid the course the more apt is the reaction to occur in the higher dilutions. From the foregoing statistics it is evident that the Lange gold chloride reaction is of value only as an aid in diagnosis.

Transplantation of Undescended Testicle.—P. Turner (*Proc. Roy. Soc. Med.*, 1915, viii, Sect. Study Dis. Child., 1) records two cases of double undescended testicle treated by transplantation to the opposite sides of the scrotum through an opening in the scrotal septum. He claims the following advantages for this procedure: (1) The testicle is transplanted to the well-developed side of the scrotum, where there is much better accommodation for it than on the ill-developed side. (2) It is usually possible to effect the transplantation without dividing the vessels of the cord. (3) Sutures to fix the testicle in its new position are unnecessary, and the organ itself is not damaged during the operation. (4) When the testicle has been drawn through the septum in the scrotum the small opening contracts, and hence the weight of the scrotum acting through the septum exerts a continuous slight force tending to keep the testicle in its new position. (5) The operation is carried out without dividing the external abdominal ring and with the least possible damage to normal tissues.

Sugar Content of the Blood in Childhood.—Using a modification by Lewis and Benedict of their method, M. H. Bass (*Amer. Jour. Dis. Child.*, 1915, ix, 63) examined the blood of sixty children. Of these twenty-six were normal; the remainder were suffering from a variety of complaints. Their ages varied from two to fourteen years. They were examined from two and one-half to three hours after breakfast, so that postprandial hyperglycemia might be avoided. The temperature in all the cases but one was normal. None of the children showed glycosuria. In the series of normal children the percentage of sugar varied from 0.072 to 0.113; in other words, it did not vary from the percentage found in adults. The age of the child did not seem to influence the sugar content. The blood of children suffering from various ailments in general showed no great departure from the normal figures. Cardiac cases showing failure of the circulation gave very low readings. Two of these severely ill cases had albuminuria and all four had enlarged livers. The case of endocarditis, adherent pericardium and ascites presented considerable cyanosis, but the blood sugar was low, 0.062, which is unusual since cyanotic cases have been found to show a mild hyperglycemia. Three cases of orthostatic albuminuria all gave high readings. In the cases of cyclic vomiting the figures for the blood sugar were well within the normal limits.

Tetanus Treated with Antitetanic Serum.—J. Comby (*Brit. Jour. Child. Dis.*, 1915, xii, 1) reports three cases of tetanus cured by subcutaneous injections of antitetanic serum. It should be noted that in these three cases, which ended in recovery, the incubation period was very long—eighteen, nineteen, and twenty days respectively. It seems that tetanus which rapidly follows infection of the wound is more virulent than that of later onset. The duration of the incubation period should therefore be taken into account in forming a prognosis.

Acute Pemphigus Complicating Scarlet Fever.—In reporting a case of acute pemphigus complicating scarlet fever, in a boy aged ten years, J. M. Robertson-Ross (*Brit. Jour. Child. Dis.*, 1915, xii, 7) says that though several cases of pemphigus have been observed after vaccination, he has not been able to find any mention of the association of pemphigus with any of the other specific fevers.

R. L. Wilcox (*ibid.*, 9) records the case of a girl of thirteen years, the interesting features of which are that pemphigus occurred in convalescence from scarlet fever, that it was preceded by an unexplained edema, and that otherwise the attack of scarlet fever was free from any complications.

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